

THE JOURNAL OF
LAND & PUBLIC UTILITY
ECONOMICS



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MENTS: AN EXPERIMENT AT SUNNYSIDE GARDENS

HERBERT EMMERICH

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ELECTRIC PLANTS IN MINNESOTA

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of The Journal of Land and Public Utility Economics, published quarterly, printed at Madison, Wis., publisher at Chicago, Ill.
for April 1, 1928.

State of Illinois, } ss.
County of Cook.

Before me, a notary public, in and for the State and County aforesaid, personally appeared G. C. Leininger, who, having been duly sworn according to law, deposes and says that he is the business manager of the Journal of Land and Public Utility Economics and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:
Publisher—Cantwell Printing Company, 121 So. Pinckney Street, Madison, Wisconsin.
Editor—Richard T. Ely, Wieboldt Hall, Northwestern University, 339 E. Chicago Ave., Chicago.
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2. That the owner is: The Institute for Research in Land Economics and Public Utilities, Northwestern University, Chicago, Illinois; Albert Shaw, Pres., Board of Trustees, New York City.
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(SEAL.) JEAN GRIEFEN. (My commission expires June 6, 1928.)

G. C. LEININGER, Business Manager.

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THE PROBLEM OF LOW-PRICED COOPERATIVE APARTMENTS: AN EXPERIMENT AT SUNNYSIDE GARDENS

By HERBERT EMMERICH

ONE of the great social values of limited dividend housing companies is their unusual opportunity to experiment with new methods of building, community planning and home ownership. Being free from the pressure of earning maximum returns for stockholders, they are able to venture into untried fields. The commercial builder may follow where he hesitates to pioneer.

The City Housing Corporation is a limited dividend company which has been previously described in these pages.¹ In 1924, when the housing situation in Greater New York was still very acute, a group of socially minded men and women under the leadership of Alexander M. Bing formed this company for the purpose of erecting low-priced homes and conducting experiments in the housing field. The company purchased about 1200 lots of land in the Sunnyside sec-

tion of Long Island City. It has since constructed there a community of homes for over 1200 families in which it has incorporated many new departures in planning and construction.

Cooperative ownership of apartments was one of the first experiments that commended itself to the company. In 1924 there were practically no cooperatives for low-income families in New York City, but successful precedents were not lacking among other groups. Millions of dollars worth of cooperative apartments had been sold in Greater New York to members of the wealthy class. Built in the finest residential districts such as Fifth Avenue and Park Avenue, these apartments have attracted an increasing number of families who have been giving up their private houses and who at the same time desired an assurance of exclusiveness. These apartments, of course, are not built and sold in a "cooperative" way such as is done by a 6% limited dividend company. They are built by speculative builders

¹ Richard T. Ely, "The City Housing Corporation and 'Sunnyside,'" ² *Journal of Land & Public Utility Economics*, pp. 172-185 (April, 1926).

and the owners generally pay the builder large profits and promotion fees. Among wage-earning groups, cooperative building societies had been tried successfully in Europe for many years, usually with concessions or aid from municipalities.

There are other reasons why it seemed a logical experiment for a limited dividend company to include cooperative apartments in its first project. The company desired to stimulate home ownership rather than renting. The directors believed that selling would permit the company's capital to be returned in installment payments and thus freed for further construction, whereas, if invested in rented buildings, it would be tied up. Moreover, rent economies would probably accrue to the tenant if he owned the apartment instead of merely leasing it. Ownership would produce these economies because of greater care in property maintenance, greater length of tenure, and responsibility of each tenant for his own apartment repairs. At that time rents were rising and a cooperative purchase was an assurance against arbitrary rent increases.

The cooperative apartment, therefore, became one of the first experiments in housing at Sunnyside, together with other experiments, such as the common central gardens in the block interior, the two-room deep houses, long-term second mortgages and a community recreation park.

The First Cooperative Apartments

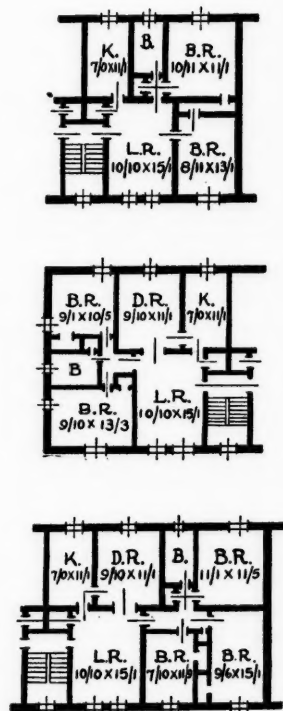
Description of Buildings. Two sets of cooperative apartment buildings have been constructed at Sunnyside. The first cooperative buildings consist of six walk-up apartments which form three groups of buildings, two buildings in each group joined by a party wall. Each building is three stories in height and has one four-room and one five-room apart-

ment on a floor. (See Chart I for floor plan.)² The typical building thus contains six families and 27 rooms. There are four basement apartments (one for the janitor), making a total of 40 families. The buildings are of brick, semi-fireproof construction with fire escapes in the rear, and cover only about 28% of the land. Like the small houses, they are only two rooms deep and each apart-

² Clarence S. Stein, architect, New York.

CHART I.

TYPICAL FLOOR PLANS OF FOUR-, FIVE-, AND SIX-ROOM APARTMENTS AT SUNNYSIDE



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ment occupies the full depth of the building and faces both the parked street and the garden block interior. Steam heat and hot water are supplied from a plant in each basement. Each apartment has a bathroom with modern plumbing. These buildings are located in the first unit or block at Sunnyside, the remainder of the unit consisting of one- and two-family brick houses. They were completed and placed on sale in October, 1924.

Legal Organization. The Sunnyside First Cooperative Housing Association had been incorporated under the cooperative law of New York State.³ This law had been designed to aid consumers' cooperative associations and had certain features which it was thought would give the cooperative apartment association more protection than the business stock corporation law under which the expensive commercial cooperatives operate. Under the cooperative law each stockholder has one vote regardless of the number of shares held by him, so that the four-room apartment owner has as much voting power as the member owning five rooms. This law also restricts the resale of stock and requires that stock offered for resale be first tendered to the association at par; it also limits the dividends that may be paid upon the stock and requires any dividends in excess of the legal rates to be returned to the consumers or users of the product in proportion to their patronage. In the case of cooperative apartments, however, this is unimportant, for the stockholding and consuming interests are identical unless some of the apartments

are rented. Under New York legal practice it is not feasible to convey title to apartments forming part of an apartment or tenement building. Accordingly, the three groups of cooperative buildings aggregating 40 apartments were conveyed to the Cooperative Association in which purchasers became "tenant-owners" by acquiring the Association's stock and a 99-year lease to an apartment.

The Association purchased the property from the City Housing Corporation, the builder and parent company, at a total price of \$205,200. This price was equivalent to about \$1150 per room, not counting bathrooms as rooms. The City Housing Corporation received as consideration the following: A first mortgage of \$96,000 from a trust company, a second mortgage of \$88,680 from the Cooperative Association and stock in the Cooperative Association for the balance of \$20,520. The second mortgage had to be taken for a long period to make the apartment purchasable by wage-earners. It corresponded to the second mortgages taken back by the City Housing Corporation in the sale of small houses to individual purchasers. In the expensive Park Avenue cooperative apartments this long second mortgage would have been unnecessary. In these projects the builder issues stock for the total equity above the first mortgage and, as he is selling to more wealthy groups, receives cash for this entire amount. Recently, certain banks and finance companies have been formed to help finance the purchase of cooperative stock of high priced apartments. However, a quick rate of repayment and high discount rates are required. These terms are therefore of no advantage to a limited dividend company for financing wage-earners' apartments, just as prevailing second mortgage rates are prohibitive in financing the sale of small houses.

³ Then Article 12 of the Stock Corporation Law; now Article 7 of the Cooperative Corporation Law, providing for Producers' and Consumers' Cooperative Stock Corporations. This law is framed primarily for cooperatives distributing goods, and it is not efficiently adapted in all its details for cooperative housing corporations.

Plan of Payment. Purchasers of the apartments became owners by buying the stock in the Cooperative Association which entitled them to a 99-year lease to the apartment. A four-room apartment, of which the price (not equity) was \$4,800, sold for a cash payment of \$480 in return for which the purchaser received 96 shares of cooperative stock at \$5 per share. This apartment had a market rental value of \$65 per month. The "tenant-owner," however, was required to make monthly payments of only \$49.92. This monthly charge included all fixed charges of interest, taxes,⁴ water, and insurance, as well as operating costs such as coal, electricity, general repairs and janitor's wages. Internal redecoration of each suite is attended to by the owner himself. No lost rent is sustained by the Association, as each "tenant-owner" carries this risk himself at the time he desires to sell. The monthly charge of \$49.92 also includes a proportion of the 2% amortization paid to the trust company on the first mortgage and graded amortization payments on the second mortgage which completely liquidates in 18½ years. As the second mortgage is paid off by the Association, it increases its capital stock and issues a proportionate fraction of this additional stock to each "tenant-owner." The result is that when the second mortgage has been completely liquidated, the four-room apartment owner will find his stock-holdings or equity increased from \$480 to \$2,554 out of a total monthly payment which is \$10 to \$15 cheaper per month than current rent.

⁴ Under a series of state enabling acts passed in 1920-1924, to stimulate residential construction, the Board of Aldermen of the City of New York adopted several resolutions in 1921-1923, exempting from local taxation until January 1, 1932, such buildings (but not the land) to the maximum extent of \$15,000 per multi-family dwelling. The saving of each "tenant-owner" at Sunnyside due to this partial tax exemption is about \$1 per room per month.

In this way the limited dividend company (acting as builder and promoter) by taking small cash payments and long-term repayment of the second mortgage at 6% enables wage-earning people to become cooperative property owners who otherwise could only remain renters. Furthermore, it enables them to purchase quarters which in light, air and sanitary arrangements are far superior to existing commercial housing. The first mortgage amortization was not capitalized by the issue of additional stock. As this liability decreases each year the Association writes off the same sum as a depreciation of its buildings. To illustrate the plan of organization and financial scheme, Tables I, II, and III have been prepared showing respectively the analysis of total annual and monthly charges, the summary of prices and charges apportioned among classes of owners, and the increasing owners' equities.

TABLE I. ANALYSIS OF TOTAL ANNUAL AND MONTHLY CHARGES FOR FIRST YEAR OF SUNNYSIDE FIRST COOPERATIVE HOUSING ASSOCIATION, 1924.

Interest on First and Second Mortgages at 6%.....	\$11,080.80	
Installments on Mortgages:		
First (2%).....	1,920.00	
Second (3%).....	2,660.40	
Taxes.....	1,500.00	
Water.....	240.00	
Fire Insurance.....	180.00	
Garden Upkeep.....	120.00	\$17,701.20
Coal.....	2,100.00	
Electricity.....	360.00	
Liability and Compensation Insurance.....	246.00	
Repairs.....	900.00	
Wages.....	1,800.00	
Management Fee.....	720.00	
Sundries.....	960.96	
Interest on Investment (4%).....	820.80	7,907.76
Total Annual Charges.....		\$25,608.96
Total Monthly Charge (one-twelfth of total annual charges).....		\$ 2,134.08

Management. The actual management of the building is handled by the City Housing Corporation as agent under a contract with the Cooperative Associa-

tion. The City Housing Corporation, through its Service Department, employs the janitor, purchases coal, collects monthly charges, disburses all monies and keeps the books rendering statements to the Association. However, the Board of Directors of the Association, elected annually by the "tenant-owners," meets monthly and receives financial and management reports from its agent. Its two main sub-committees are a House Committee, with representatives from each building, which reports on questions of maintenance, and the Admissions Committee which reports on all applications of new purchasers when apartments are resold.

Rules have been adopted for the hours when light and heat should be supplied, for waste collection, erection of radio aerials. The House Committee has been helpful to the management in making plans for the improvement of the property and its proper maintenance, including repainting of doors, laying stair coverings, and cultivating gardens in the front and rear of the buildings. The Admissions Committee, in addition to its regular duties, also had to mediate in disagreements between "tenant-owners" and, by prompt action in allowing each side to state its case, has succeeded in keeping families amicable.

One of the very difficult points to decide in cooperative apartments is the question of maintenance expenses. The proprietary lease which each stockholder receives requires him to take care of his own apartment and requires the Cooperative Association to take care of general house repairs. Questions continually arise in matters such as electric wiring and hall repairs, as to whether they are to be taken care of by the individual or the Association. Other problems present themselves such as that of subleasing. In most cases the Association has preferred not to permit long-term subleases by its "tenant-owners" and in several instances has itself purchased the apartment from owners who were moving and subleased it until a purchaser could be found. A good income was enjoyed by the Association from these rents and it was felt that the income should be shared in common as an Association rather than apportioned to an individual "tenant-owner."

Mainly on account of the extremely low rents, the first cooperative building at Sunnyside has had practically no vacancies. Three consecutive dividends have been paid at Christmas (never exceeding 4%) to the stockholders of the Association. These cash returns have been a most convincing proof of the

TABLE II. SUMMARY OF PRICES AND CHARGES APPORTIONED* AMONG CLASSES OF OWNERS, SUNNYSIDE FIRST COOPERATIVE HOUSING ASSOCIATION, 1924.

Item	Total	Basement Apartments	Four-Room Apartments	Five-Room Apartments
Number of Apartments.....	40	4	18	18
Index Number.....	100.00	.01753	.02339	.02827
Cash Payment.....	\$ 20,520	\$ 360.00	\$ 480.00	\$ 580.00
First Mortgage.....	96,000	1,685.44	2,245.77	2,713.02
Second Mortgage.....	88,680	1,554.56	2,074.23	2,506.98
Purchase Price.....	\$205,200	\$3,600.00	\$4,800.00	\$5,800.00
Monthly Charges (1925).....	\$2,134.08	\$ 37.44	\$ 49.92	\$ 60.32

* The total amounts are multiplied by the index number in fixing prices and charges on individual apartments so that all members will always be on the same equitable basis.

merits of cooperation. In addition, a surplus fund has been accumulated. Most of the original "tenant-owners" are still in the buildings which are now going into their fourth year. They are mostly of the "white collar" class, including teachers, nurses, social workers and office employees. The families are small, but few of them having children, and in most cases the incomes are under \$3000 a year.

The Second Cooperative Apartment Group

Although the sales of the first cooperative apartment group at Sunnyside were distinctly slower than the sale of the one- and two-family houses and the sale of the buildings to the Cooperative Association did not yield even the moderate margin of profit above cost which a 6% dividend building company should obtain, the City Housing Corporation directors decided to include another co-

operative unit in the second year's operations. The Sunnyside Second Cooperative Housing Group was accordingly planned and pains were taken to overcome some of the difficulties experienced in planning the first unit.

The entire group of cooperative buildings in the second unit was placed together and served by one heating plant for 32 apartments instead of three heating plants for 40 apartments as in the first unit. The plan of incorporation and purchase was very similar to the first project, differing only in details. The room sizes and specifications were greatly improved and the buildings were consequently more expensive and sold for an average of \$1430 per room. They consisted of 14 four-room apartments, 9 five-room and 9 six-room apartments each with one bath. In this case there was no tax exemption benefit as the time

TABLE III. ANNUAL INCREASE IN OWNERS' EQUITIES THROUGH REDUCTION IN SECOND MORTGAGE, CLASSIFIED ACCORDING TO DIFFERENT TYPES OF APARTMENTS*

End of Year	Total Second Mortgage Reduction	Basement Apartments	Four-Room Apartments	Five-Room Apartments
1.....	\$2,700.31	\$ 47.34	\$ 63.16	\$ 76.34
2.....	5,565.07	97.56	130.22	157.32
3.....	8,604.28	150.83	201.25	243.24
4.....	11,828.59	207.35	276.67	334.39
5.....	15,249.26	267.32	356.68	431.10
6.....	18,878.25	330.94	441.56	533.69
7.....	22,728.25	398.43	531.61	642.53
8.....	26,812.71	470.03	627.15	757.99
9.....	31,145.91	545.99	728.50	880.49
10.....	35,742.90	626.57	836.03	1,010.45
11.....	40,619.95	712.07	950.10	1,148.33
12.....	45,794.01	802.77	1,071.12	1,294.60
13.....	51,283.17	898.99	1,199.51	1,449.78
14.....	57,106.63	1,001.08	1,335.72	1,614.40
15.....	63,284.73	1,109.38	1,480.23	1,789.06
16.....	69,839.09	1,224.28	1,633.54	1,974.35
17.....	76,792.58	1,346.17	1,796.18	2,170.93
18.....	84,169.57	1,475.49	1,968.73	2,379.47
18½.....	88,024.87	1,543.07	2,058.91	2,488.46
Total Increased Investment.....	\$ 88,680.00	\$1,554.56	\$2,074.23	\$2,506.98
Original Investment.....	20,520.00	360.00	480.00	580.00
Total Investment after Liquidation of Second Mortgage.....	\$109,200.00	\$1,914.56	\$2,554.23	\$3,086.98

* This table shows how under the cooperative plan a proportion of the rent goes to savings and annually increases the investment in each apartment as the second mortgage is paid off. At the end of each year additional stock in full shares of \$5 par value is issued to each of the stockholders. Amounts under \$5 will be credited to the members until the next stock distribution.

had expired under the law in which new buildings could secure this privilege. Furthermore, the land was more valuable and taxes were higher. A first mortgage was procured (without amortization) at $5\frac{1}{2}\%$ interest, and the City Housing Corporation took back a second mortgage repayable in 20 years at an annual amortization aggregating 5%. The total selling price of a four-room apartment in the second cooperative was \$6,000. The cash payment was \$600 and the total monthly charges \$65.48. These charges were almost \$16 more per month than in the first cooperative and were equivalent to market rentals, although \$12.50 of this amount went to increased

efficiency of the latter project, the former had the great advantage of lower interest charges (because of lower original cost) and lower taxes. It also had smaller amortization and dividend requirements in the early years.

The sales in the second cooperative apartment were started in July, 1925, when the buildings were open and after six months of intensive effort fewer than half of the apartments had been sold. The City Housing Corporation had guaranteed to pay the rents on all the original apartments until they were sold and this monthly carrying charge threatened to become a serious burden in view of the slow manner in which the building was filling up. Consequently, the directors decided to secure tenants and rent these apartments with an option to purchase any time within the one-year lease in the hope that in this way people would be converted to cooperation. At the end of the term in the autumn of 1926 only two tenants became purchasers, while several apartments came back to the Company. It became necessary again to renew leases. During 1927 the assessed valuation of the buildings was greatly increased by the Tax Department of the City and taxes which were originally estimated at \$3,000 rose to \$4,500. This jeopardized the expected 6% dividend on stock of the Cooperative Association and the "tenant-owners" voluntarily offered to increase their own monthly charges rather than jeopardize payment of this dividend.

Just as this goes to press the "tenant-owners" have decided that the collection of a monthly amount sufficient to pay a 6% dividend on the cooperative stock made the rents fictitiously higher and might discourage sales. Accordingly, after July 1st, 1928, the 6% dividend paid by the Second Cooperative Association will be eliminated and the monthly

TABLE IV. COMPARATIVE ANALYSIS OF MONTHLY CHARGES ON FOUR-ROOM COOPERATIVE APARTMENTS, FIRST AND SECOND PROJECTS, SUNNYSIDE GARDENS (FIRST YEAR OF PLAN).

Item	First Cooperative	Second Cooperative
Interest on Mortgage	\$21.59	\$26.05
Property Taxes	2.93	10.14
Operating Expenses (Insurance, Coal, Wages)	14.87	13.79
Amortization on First Mortgages (Not distributed) (Offset to Depreciation)	3.74	
Total Expense or Net Rent	\$43.13	\$49.98
Amortization on Second Mortgage (Distributed Annually by Additional Stock)	5.19*	12.50
Dividend on Stock Equity	1.60†	3.00‡
Total Monthly Charges	\$49.92	\$65.48
Sales Price	\$4,800.00	\$6,000.00
Cash Payment	480.00	600.00
Equity in Stock on Liquidation of Second Mortgage	2,554.23	3,600.00
Number of Years to Liquidate Second Mortgage	18½	20

* Increases Annually—in First Cooperative.

† 4% Dividend on \$480.

‡ 6% Dividend on \$600.

ownership (additional stock) and \$3 to dividends on the \$600 investment at the annual rate of 6%. Because the advantage over current rentals was not nearly so apparent as in the first cooperative, much greater difficulty in selling the second group was experienced. Table IV gives a comparative analysis of the monthly charges in four-room apartments in the first and second cooperatives. In spite of the increased operating

charges reduced over \$3 on the four-room apartments.

During 1927 the City Housing Corporation was constructing its fourth unit and sold almost 200 one- and two-family houses. It also constructed a large rented apartment group for 86 families. This activity diverted the interest of the Sales Department from the selling of the older second cooperative buildings. The small group of cooperative owners in these buildings had become convinced of the advantages of cooperation and made a strong plea to the company to assist in disposing of the rented apartments and to make the buildings completely cooperative. It was agreed, therefore, during 1928, to discontinue renting and to concentrate on the sale of cooperative apartments as the tenants moved out. A specially qualified person was placed in charge of this sales campaign and the owners of the apartments themselves joined enthusiastically in helping the campaign. It is too early to report the results. However, in spite of the spirited aid of the "tenant-owners," the campaign thus far has only resulted in the sale of three apartments, so that of the original 32 apartments there are now owners for 16 or 50% of the total number. The sales have been made with difficulty after considerable education of inquirers. This resistance has been in marked contrast to the ready sale of houses and straight rental of apartments which has characterized the remainder of Sunnyside.

Advantages and Disadvantages of Cooperative Ownership Experienced at Sunnyside

The experience at Sunnyside shows that the low-priced cooperative apartment idea has certain disadvantages and presents special problems and difficulties which have not been encountered with the one-family and two-family

houses or rented buildings. We have had sufficient time now to weigh these objections.

To the prospective home-owner of moderate means, the first great disadvantage of the cooperative is its complexity. The average man can understand the idea of buying an individual house and, of course, is acquainted with leasing. However, arrangements of stock ownership and corporate control are totally new to him. This complexity also makes reselling difficult. Furthermore, because inexpensive cooperatives have not generally been built, many people are not actually looking for apartments of this kind. Usually this means that the would-be renter must be converted to the advantages of cooperation.

Financing wage-earners' cooperatives is another difficulty. Most cooperatives are sold by selling for cash the entire equity above the first mortgage, which is about 50% of the price. In order to make a cooperative apartment purchasable for a down payment of \$500 to \$800, the City Housing Corporation has had to take back a very large second mortgage. In addition to this, a low monthly charge must be maintained in order to make cooperative ownership comparable with renting, and the financing, therefore, has had to be stretched over a long period of years in small monthly payments.

The selling of cooperatives at Sunnyside was much slower than the sales of houses and rentals, not only because of the complexity of the cooperative scheme, but also because these other properties themselves offered a very serious competition. Of course, the slow sale involved a considerable cost to the City Housing Corporation for carrying charges on vacant apartments. The problem of re-sales is even a harder one, for the amount of cash necessary to purchase increases each year. The City

Housing Corporation was compelled too frequently to repurchase apartments in order to save departing "tenant-owners" or the Cooperative Association from serious loss.

The problem of management is difficult in a cooperative apartment of this type because the resources of owners are very slender and any unusual expense may seriously disturb a carefully prepared budget. The instance of the increase of taxation in the second cooperative has already been mentioned. There is also a certain amount of ignorance and individualism which hampers cooperation in management, but "tenant-owners" of the Sunnyside apartments have already learned a good deal in this respect.

However, despite these difficulties experience shows that cooperative apartments offer certain advantages which cannot be secured by other methods. First, this method of ownership enables people to own units with all the conveniences which an apartment offers. The Corporation has been able to sell a four- or five-room unit dwelling at a lower price than any other of its dwellings. For women and older people who cannot maintain their own properties or who do not want to tend furnaces or climb stairs, the cooperative apartment has a distinct usefulness. Although, as stated above, re-selling is somewhat harder than in the case of houses, it should be borne in mind that another advantage of the cooperatives is the ease of sub-letting. This is a great protection to the owner who may be obliged to leave for a short time, because he knows his charges can be met until he can sell his apartment.

In cooperative apartments organized on the Sunnyside plan, a new purchaser is protected against undue increment, because under the by-laws the cooperative has control over re-sales. The co-

operative has the advantage of providing a logical civic or group organization through which individual "tenant-owners" may express their wishes concerning new purchasers and management, whereas this does not exist in the case of the private house.

Other Experiments in Cooperative Ownership

Several large cooperative housing plans have been started in Greater New York since the construction of Sunnyside First and Second Cooperatives. It is yet too early to trace the ultimate success of these other ventures.

The apartments constructed by the Amalgamated Clothing Workers Union in 1927 in the Bronx were well planned and constructed and sold quickly to Union members and their friends. The Paul Lawrence Dunbar apartments, constructed by Mr. John D. Rockefeller, Jr., have enjoyed a quick sale to a splendid type of negro family. These, as well as other less outstanding examples, seem to indicate that the cooperative's best chance for success lies among a homogeneous fraternal or racial group. A common bond or tie among the owners seems to be needed in the cooperative housing movement. People seem to feel that in living as close together as they must in apartment quarters they do not wish to be permanent owners unless they have their own kind for neighbors. Perhaps the psychology back of this feeling is the same in the case of the expensive Park Avenue cooperatives as it is among the fraternal or racial groups.

To organize cooperative associations by sale of apartments at random to salaried individuals not chosen from any particular group is a discouraging undertaking. Until the education of the public is advanced and until the market is established for these apartments, this

will continue to be true. In our large cities the average salaried man cannot undertake a long ownership or purchase contract because of the shifting nature of his employment. This applies in a measure to other forms of home ownership as well, but the private house purchaser is generally more established and certain of his tenure. It is interesting to note that another unit of cooperative apartments built by Mr. John D. Rockefeller, Jr., on Mott Avenue in the Bronx, which did not appeal to any particular racial or fraternal group, proved to be more difficult to sell than did the project designed for negroes.

It should be pointed out that in these other ventures the cooperative plan itself is abridged and modified. Mr. Rockefeller and the Amalgamated Clothing Workers Union, as financiers and builders, maintain a considerable control during a lengthy period over matters of finance and management. It remains to be seen, however, whether they will experience a similar rental problem. It is expected that when purchasers have to move there will be other members of the group to purchase these apartments which was not the case at Sunnyside.

The Lessons of Sunnyside Experience

Even fraternal and semi-philanthropic ventures are no magic road to low rents. They require all the skill in the selection of site, architectural planning, economical construction and financing that is required in a successful commercial housing operation, but they have the additional requirements of easy terms in purchase, and strong financial backing in bearing the initial risks. Estimates of carrying charges should be generous to permit the housing association to build up ample surplus in its early years when the buildings are new and attrac-

tive. On all business questions a professional type of management is needed. Amateur management committees are successful only in an advisory capacity and cannot be relied upon for administrative tasks. The promoters and managers must have a helpful attitude and great patience in educating the cooperative groups to their problems.

At Sunnyside Gardens the City Housing Corporation has built three groups of apartments since the First and Second Cooperatives were completed. These were larger and more economical units accommodating 80 families and each served by one heating plant. Because of the difficulties of the cooperative plan, ownership was retained by the City Housing Corporation and the apartments were rented, not sold. Some of the advantages of cooperation were secured to the tenants by allowing a considerable reduction in rent for two- and three-year leases without redecoration. This simple plan has proved very popular and all the buildings were rented before completion. An ample security deposit is required from tenants taking a long-term lease to insure performance. In this way the limited dividend company shares with its tenants the economies resulting from longer tenure and the saving from having no lost rent or redecoration costs. None of the complications or difficulties of the cooperative plan are encountered. The company enjoys a good income from its properties and the tenant obtains good housing facilities at unusually low rents. Moreover, the rented apartment at Sunnyside becomes a rung on the ladder toward home ownership. The tenant of an apartment learns the advantages of home ownership by contacts with purchasers of homes and it appears from experience that in a good many cases tenants will acquire courage and become purchasers of homes.

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PRESENT REASONABLE RATE OF RETURN FOR PUBLIC UTILITIES*

By HOWARD D. DOZIER¹

THE courts have reiterated in public utility rate cases the pronouncement that the value of a utility, or the rate-base, shall be as of the date of the hearing.² If this be necessary, it is equally important that the rate of return to be used with the rate-base, in order to arrive at reasonable rates, shall be as of the same date. The product of the rate-base as of a given date and the reasonable rate of return as of the same date is the amount according to which the reasonableness of the current net operating income is to be gauged. What rate of return on the value of its property, whatever may be the proper method of arriving at that value, can a public utility now reasonably expect to receive?

From *Smyth v. Ames*³ to the Indianapolis Water Case⁴ the rate-base has been the storm center. Rate of return, though equally important, has received less attention. Clearly, if the rate of return is to be linked with a rate-base, it must, to be of any account, be as of the same date as the rate-base. This proposition is so fundamental that it is surprising that commissions and courts have so frequently applied the *average* rate of return over a period of time to the value of the property, or the rate-base, which is determined at a *specific* date.

This process can lead to the establishment of equitable rates only if the period at the time of the hearing is normal. But rate cases rarely arise at such times. They arise when the utility thinks its rates are producing an abnormally low income, or the public thinks they are producing an abnormally high one. Usually reasonable rates will produce a large net operating income and a high rate of return during a period of prosperity for a utility, and a low net operating income and a small rate of return during a period of depression. But memory is short. During a period of temporary prosperity the public soon forgets the lean years through which the utility may have passed; witness the railroad situation today. Likewise, during a period of temporary depression a utility is likely to forget the fat years of the past and to set up its temporary difficulty as an excuse for a permanent raise in rates.

Ordinarily the question before the regulatory body or the court is whether the low earnings and consequent small return are lower than low earnings and small return should be; or whether high earnings and large return are higher than they properly should be. A rate-schedule designed to produce an *average* reasonable rate of return at a time when earnings can be expected to be high is

to him most likely to secure justice for all the parties at interest in a rate case.

² See *Wilcox v. Consolidated Gas. Co.*, 212 U. S. 19 (1908); *Minnesota Rate Cases*, 230 U. S. 352 (1913); *Southwestern Bell Case*, 262 U. S. 276 (1923).

³ 169 U. S. 466 (1897).

⁴ 272 U. S. 400 (1926).

*Editorial Note: The detailed data on which this analysis is founded are too voluminous to publish with the article. The basic data may be obtained by addressing the author at Silver Spring, Maryland.

¹ The writer is frequently called upon to testify as to "reasonable rate of return" in public utility hearings. This article suggests a method of approach which seems

unreasonably low and vice versa. Failure to give sufficient recognition to this fundamental fact is responsible in no small degree for our ever-recurring rate cases.

In the absence of a working agreement between the public and the utility, the duty of a rate-making body is to fix a schedule of rates and keep it fairly stationary, *not to fix a rate of return and keep it fixed*.

I have recently reviewed evidence taken in a case in 1922. The regulatory authority adopted 7% as a reasonable rate of return and its findings were sustained by a federal court. Rates found reasonable on the basis of this return on the 1922 value of the property produced a return of 10%, 17½%, and 11% in each of the three succeeding years. Had the case arisen in 1924 and had 17½% been used as a rate-factor in precisely the same manner as 7% was used in 1922, the identical schedule of rates would have resulted. If 7% in 1922 was reasonable, then 17½% was reasonable in 1924, for the same schedule of rates produced both returns. If 17½%

was too high in 1924, then by the same token 7% was too high in 1922. The rate of return applied to the 1922 value should have been about 3% in order to have resulted in the schedule of rates at which the regulatory body evidently was aiming; namely, rates which would produce an average return of 7% over a period of years. But the regulatory body would have had little chance of convincing the court of the reasonableness of a 3% rate of return under conditions as they existed in 1922 or at any other time.⁵ In short, when a fixed rate of return is used as a factor for calculating rates, its reasonableness will vary with changing economic and operating conditions.

In the light of this distinction between return used as a rate-factor and the average rate of return used as a criterion of reasonableness, the purpose in the

⁵ For a fuller discussion as to the distinction between the rate of return as of a given time used as a rate-making factor, and the average rate of return over a period of years used as a criterion of reasonableness see Dozier, "Reasonable Rate of Return in Public Utility Cases" 3 *Journal of Land and Public Utility Economics*, 71-76 (February, 1927).

TABLE I. FINANCIAL STATISTICS OF 13 SELECTED PUBLIC UTILITIES, 1921-1926, INCLUSIVE

ITEM	DECEMBER, 1926		6-YEAR AVERAGE, 1921-1926, INCL.	
	Amount	Per Cent.	Amount	Per Cent.
Bonds outstanding.....	\$1,030,130,550	32.84%	\$819,499,637	33.76%
Preferred stock.....	204,171,832	6.51	159,160,847	6.56
Common stock.....	1,902,276,474	60.65	1,448,346,482	59.68
Total capitalization.....	\$3,136,578,856	100.00	\$2,427,006,966	100.00
Surplus.....	416,559,082	13.28	314,030,015	12.94
Book value of common stock per share.....	120		119	
Value back of each \$1,000 in bonds.....	3,449		3,345	
Times bond interest earned.....	5.22		4.59	
Interest paid.....	52,111,091	5.06	44,077,079	5.38
Yield to investors in bonds if held to maturity.....		4.96		
Preferred dividends paid.....	11,619,042	5.69	8,627,746	5.42
Yield to investor in preferred stock.....		6.2		
Available for common dividends and surplus.....	208,118,339	10.94	149,800,950	10.34
Yield to investor in common stock at dividend rate.....		5.79		
Return to the corporations on their book value.....		7.65		7.39

remaining pages is to suggest a procedure by which a reasonable schedule of rates may be established through the application of a reasonable return as of the date of the hearing to the value of the property as of the same date.

A criterion of reasonableness of public utility rates, stated by the United States Supreme Court theretofore, was amplified in its decision in the Bluefield Water Works case.

"A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties."⁶

What facts can be discovered and brought to bear on the establishment of schedules of rates which will conform to

this criterion? What rate of return on the value of the property as of 1926 or 1927, for instance, would a schedule of rates have had to produce in order to be reasonable and fair and maintain the soundness of the company's credit?

During the calendar year 1926 there were 13 public utility and 81 industrial and miscellaneous dividend-paying common stocks listed on the New York Stock Exchange whose monthly average price was \$100 or above, or that equivalent.⁷

The credit enjoyed by each of the corporations whose common stock is included in this group is of the first rank.⁸ Hence, a rate policy which will maintain the credit of a public utility on a parity with that enjoyed by this group, or by any considerable number of corporations

⁶ *Bluefield Water Works and Improvement Co. v. Public Service Commission of W. Va.*, 262 U. S. at 692-693 (1922).

⁷ No-par stocks, and stocks of less than \$100 have been reduced to \$100 par on the basis of the recent history of the corporation.

⁸ The facts that funded indebtedness is about one-third or less of the total capital indebtedness and that surplus is about one-third of total capital obligations, are pertinent in this connection.

TABLE II. FINANCIAL STATISTICS OF 81 SELECTED INDUSTRIALS, 1921-1926, INCLUSIVE

ITEM	DECEMBER, 1926		6-YEAR AVERAGE, 1921-1926, INCL.	
	Amount	Per Cent.	Amount	Per Cent.
Bonds outstanding.....	\$829,893,499	12.46%	\$889,083,628	14.42%
Preferred stock.....	1,513,429,793	22.72	1,477,810,638	23.96
Common stock.....	4,316,648,621	64.82	3,800,099,208	61.62
Total capitalization.....	\$6,659,971,913	100.00	\$6,166,993,474	100.00
Surplus.....	3,232,101,501	48.53	2,594,523,248	42.07
Book value of common stock per share.....	155		149	
Value back of each \$1000 in bonds.....	11,920		9,855	
Times bond interest earned.....	24.92		15.23	
Interest paid.....	45,363,785	5.47	49,969,322	5.62
Yield to investor in bonds if held to maturity.....		4.99		
Preferred dividends paid.....	103,227,853	6.82	99,874,325	6.76
Yield to investor in preferred stock.....		5.80		
Available for common dividends and surplus.....	928,062,423	22.75	611,241,095	16.08
Yield to investor in common stock at dividend rate.....		5.42		
Return to the corporations on their book value.....		11.43		8.69

in the group, must be adjudged to be liberal. The salient facts concerning these 94 corporations are shown in Tables I, II and III.

Table IV summarizes the market experience during 1926 of the three main classes of securities of each group of corporations. The prices at which these securities were sold and the yields to the investor together with the six-year average earnings available for dividends, shown by years in Table V, indicate the investors' confidence in the credit of these corporations. The public utilities evidently were permitted to charge rates which yielded ample earnings to maintain credit. Moreover, the adequacy of earnings, generally, according to the judgment of the various managements, is attested by the large number of splits made and stock dividends declared.⁹

Any regulatory body, therefore, which proposed to use its rate-making power to maintain the credit of the utility for whose rates it was responsible on a parity with that of these corporations, would hardly be accused of illiberality.

⁹ See Federal Trade Commission Report of Stock Dividends in response to Senate Resolution 304—69th Congress. *Senate Document*, No. 26, 70th Congress, 1st session.

Resort to the experience of these corporations, however, could not relieve the regulatory body of the exercise of a reasonable and flexible judgment. Public utility rate-making is more than a paper and pencil proposition. It is more than mathematical calculation and statistical analysis. A reasonable judgment, based upon ascertainable facts, is more likely to lead to the establishment of equitable rates than one based solely upon such facts or solely upon opinion evidence.

Properly interpreted such information as the above serves to establish definite limits within which reasonable judgment must be exercised. Furthermore, it is of some help in locating the point within the zone of reasonableness near which the rate of return under reasonable rates will be found.

A reasonable schedule of rates in force in 1926 or 1927 would have had to produce enough operating revenue to pay all reasonable operating expenses, an interest rate of approximately $5\frac{1}{4}\%$ ¹⁰ on bonds, $6\frac{1}{4}\%$ dividends on preferred stock, and about $8\frac{3}{4}\%$ dividends on

¹⁰ The $\frac{1}{4}$ of 1% added to the indicated interest and preferred dividend rate covers discount in floating issues sufficiently large to raise the necessary capital.

TABLE III. FINANCIAL STATISTICS OF 94 SELECTED INDUSTRIALS AND PUBLIC UTILITIES COMBINED, 1921-1926, INCLUSIVE

ITEM	DECEMBER, 1926		6-YEAR AVERAGE, 1921-1926, INCL.	
	Amount	Per Cent.	Amount	Per Cent.
Bonds outstanding.....	\$1,860,024,049	18.98%	\$1,708,583,265	19.88%
Preferred stock.....	1,717,601,625	17.53	1,636,971,485	19.05
Common stock.....	6,218,925,095	63.49	5,248,445,691	61.07
Total capitalization.....	\$9,796,550,769	100.00	\$8,594,000,441	100.00
Surplus.....	3,648,660,583	37.24	2,908,553,263	33.84
Book value of common stock per share.....	146		142	
Value back of each \$1000 in bonds.....	7,229		6,732	
Times bond interest earned.....	14.39		10.25	
Interest paid.....	97,474,876	5.24	94,046,400	5.50
Preferred dividends paid.....	114,846,895	6.69	108,502,071	6.63
Available for common dividends and surplus.....	1,190,180,762	19.14	761,042,045	14.50
Return on book value.....		10.43		8.38

TABLE IV. SECURITIES OF 13 PUBLIC UTILITIES AND 81 INDUSTRIAL AND MISCELLANEOUS CORPORATIONS COMPARED FOR 1926

Type of Security and Item Compared	Public Utilities	Industrials and Miscellaneous
Representative Senior Bonds—		
Weighted average price during 1926.....	\$103 $\frac{3}{8}$ %	\$105 $\frac{3}{4}$ %
Current yield to investor.....	5.10%	5.20%
Yield to maturity.....	4.96%	4.99%
Weighted average yield to maturity at price on December 30, 1927.....	4.72%*	4.90%†
Preferred Stock—		
Weighted average price during 1926.....	\$97 $\frac{3}{8}$ %	\$117 $\frac{3}{8}$ %
Weighted average dividend rate.....	6.0%	6.8%
Yield to investor.....	6.2%	5.8%
Weighted average yield at price on December 30, 1927.....	5.86%‡	5.43%
Common Stock—		
Weighted average monthly price during 1926\$.....	\$147 $\frac{1}{8}$ %	\$227 $\frac{3}{8}$ %
Weighted average cash (Small stock dividends converted into cash) dividends during 1926.....	8.6%	12.3%§
Common dividend rate.....	8.75%¶	.....
Average yield to investor.....	5.79%	5.42%
Weighted average earnings for six-year period (1921-1926).....	\$10.34	\$16.08

* Compare the yield on public utility and industrial bonds given in *National City Bank Bulletin*, January, 1928, p. 15.

† The American Ice gold debenture 7's due in 1939 were retired during the year and are not included in the 1927 average. In those cases where refunding has taken place the new bonds have been substituted for those refunded.

‡ Only such preferred stocks were used in the compilation of this yield as were outstanding and quoted on December 30, 1927, or, if not on that date, during the month of December.

§ \$100 par or \$100 par equivalent basis.

¶ There were fewer dividends above that figure than below it.

‡ The most common (modal) rate of dividend paid was 8%.

common stock, upon an amount of securities equal to the reasonable value of the utility property as of that date. These percentages, applied to a financial structure under which the utility could operate prudently, produce a non-confiscatory rate of return.

If a financial structure one-third bonds, one-third preferred stock, and one-third common stock is assumed to furnish sufficient latitude for the further issuance of such securities as the money market and general conditions might dictate from time to time, the following minimum rate of return results:

$\frac{1}{3}$ bonds.....at 5 $\frac{1}{4}$ % equals 1.73%
 $\frac{1}{3}$ preferred stock.....at 6 $\frac{1}{4}$ % equals 2.06%
 $\frac{1}{3}$ common stock.....at 8 $\frac{3}{4}$ % equals 2.91%

Minimum rate of return necessary to escape confiscation.....6.70%

But the duty of a regulatory body is not the *negative* accomplishment of

establishing rates which will barely escape confiscation. It is the *positive* one of establishing reasonable rates, and reasonableness demands something more than non-confiscatory rates. Some assurance must be given by the regulatory body that it will, in so far as its rate-making power goes, place the utility in position to continue this payment of reasonable operating expenses, interest,

TABLE V. ANNUAL EARNINGS PER SHARE OUT OF WHICH DIVIDENDS ON COMMON STOCK WERE PAID BY 94 CORPORATIONS FROM 1921 TO 1926, INCLUSIVE.

YEAR	TYPE OF CORPORATION	
	Public Utilities	Industrial and Miscellaneous
1921.....	\$ 8.88	\$ 5.21
1922.....	9.80	12.23
1923.....	10.72	16.52
1924.....	9.93	15.99
1925.....	11.01	20.24
1926.....	10.94	22.75

preferred and common dividends. That assurance can be given by either of two policies. Rates may be raised when earnings fall below the true cost of service enumerated and lowered when earnings are more than necessary to meet these requirements. But a policy based upon fluctuating rates and a uniform rate of return is not usually followed except when some form of sliding-scale agreement exists.

On the other hand, the continuous payment of interest and dividends can also be assured by establishing a rate-schedule high enough to produce operating expenses, interest and dividends, and an additional amount which will enable the utility to pay its expenses and meet its interest and dividend payments when the earnings in any one year are insufficient for those purposes. This latter policy involves stable rates and a fluctuating rate of return.

The former policy proposes to maintain credit by potential additional earnings procurable through the advancing of rates. The latter proposes to maintain credit through surplus accumulation, that is, through establishing a margin of safety for common stock. Inasmuch as a dollar yet to be earned through a prospective raise in rates is less potent in maintaining the credit of a utility than a dollar already in hand, the policy of adopting a fairly stable rate-schedule and a fluctuating rate of return is less expensive to the public in the long run and, therefore, preferable.

If this policy be adopted, the regulatory body must decide what surplus or what margin of safety for common stock the rates should be designed to produce. What is the upper limit to the zone of reasonableness?

In 1926 the 81 industrial corpora-

tions,¹¹ whose common stock sold at the equivalent of \$227 per share of \$100 par, earned \$22.75 on their common stock¹² and paid dividends amounting to \$12.30. That is, for every dollar paid out in common dividends, \$.85 was retained in surplus out of which to expand, meet contingencies, and stabilize dividend payments.

If a regulatory body were so liberal as to attribute the same amount of risk to a public utility as to such industrial and miscellaneous undertakings as these, it could provide against this risk by adopting a schedule of rates which would have produced in 1926, in addition to reasonable operating expenses, interest and preferred dividends, \$22.75 per share on common stock. If the same financial structure be assumed as was the case in arriving at the lower limit, the result would be as follows:

$\frac{3}{4}$ bonds.....	at $5\frac{1}{4}\%$	equals 1.73%
$\frac{1}{4}$ preferred stock.....	at $6\frac{3}{4}\%$	equals 2.06%
$\frac{1}{4}$ common stock.....	at $22\frac{3}{4}\%$	equals 7.58%

Maximum rate of return allowable.....11.37%

The variation from this maximum dictated by judgment would be more likely to arise from the necessity of a change in the assumed financial structure than from change in rates applicable to the various securities.

Tested by the experience of the foregoing industrial corporations, the limits of the zone of reasonableness would probably be a minimum of 7% and a maximum of $11\frac{1}{4}\%$, a spread of $4\frac{1}{4}\%$. The remaining problem is to arrive at a rate lying within these limits for the utilities alone. Upon what facts should this judgment be based?

The earnings of the large public utilities in the group of corporations selected as a criterion have been com-

¹¹ An appendix to this paper gives the data on which these statements are based. See editorial note, p. 235.

¹² Expressed in terms of shares before recent splits.

paratively stable. The surplus has varied little from an amount equal to 13% of the total capitalization, or 20% of the common stock.

On the basis of the performance of this group of utilities, which includes some of the largest and most stable to be found, good judgment probably would dictate for the smaller companies a wider spread between necessary dividends and earnings on common stock than shown by the large ones. This would tend to raise the lower limit of the zone of reasonableness.

On the other hand, for a particular utility it probably would not be necessary to provide as wide a margin as that enjoyed in 1926 by the industrial and miscellaneous corporations included in the criterion group. The exercise of such a judgment would have the effect of lowering the upper limit of the zone of reasonableness, let us say to 10%. In almost any case, therefore, the rate of return which reasonable rates would have produced in 1926 or 1927 would probably be found between 7% and 10%.

But the aid to be had from the foregoing analysis of the criterion group of corporations is not yet exhausted. The value which the investing public placed upon the securities of these selected public utilities in 1926 was \$3,774,633,556.¹³ The value which the utility corporations placed upon all their assets as shown by their books was \$3,553,137,938. The rate of earnings upon net worth and funded debt, or the sum of the securities and surplus, was 7.6% for that year as compared with 7.39% for the six-year period. The rate of earnings

in 1926 upon the total market value of all securities was 7.18%.

In the case of the industrials, the value of the securities to the investing public was \$12,177,726,260 as compared with \$9,892,073,414 at which total assets were being carried on the books. The rate of earnings on the book value of the industrials in 1926 was 11.43%, as compared with 8.69% for the six-year period. The rate of earnings on the total market value of all securities outstanding was 9.28%.

A reasonable judgment would begin to settle on a figure not far from 8% as the rate of return which reasonable rates would have produced for an ordinary utility in 1926, and probably in 1927. Considering the unusual conditions which prevailed in 1926, a return above 8% would not be *prima facie* evidence of the unreasonableness of rates.

But even if reasonable rates would have produced 8% or perhaps slightly more in 1926 under the conditions then prevailing, we are not warranted in assuming that in order to be reasonable such rates must always and under all conditions continue to produce that rate of return; no more, no less.

The above analysis applied to preceding or succeeding years would result in a different reasonable rate of return for each year on the value of the property as of that year. Some sort of an average of these different annual rates of return may be obtained, but if this average return for the period be coupled with the value of the property as of the date of a hearing, a different schedule of charges will result, and conceivably a very different one, from that which produced the varying rates of return from which the average resulted.

Failure of regulatory authorities to impose on themselves the same time

¹³ Inasmuch as only the most important bonds of the corporations were used in obtaining the interest rate, the face value of the bonds in 1926 is taken as the total market value. That this is a close approximation is borne out by the fact that the senior bonds sold at only slightly above par.

limitation with respect to rate of return as that which they have imposed with respect to value has resulted in an impossible attempt to secure both a stable rate-schedule and an invariable rate of return.

The arriving at a reasonable rate of return through comparison with the return earned during comparable periods by successful corporations of undoubted credit, and the use of this return as a rate-factor, necessitate a later testing. This test, however, should amount to little more than a repetition of the method used in the original determination of the rate of return. Such a method of rate-making and rate-testing relieves regulatory authorities of the indictment often made, but seldom answered, that regulation penalizes efficiency by limiting income, though the excess income may be the result of exceptionally good management.

When reasonable rate of return is interpreted as a variable, rising and falling with changing conditions, the statement that a utility is entitled to earn a fair return on the fair value of its property is not the equivalent of saying that a utility is entitled to earn only so many dollars and no more. Reasonable return may be thought of as a point moving in a plane. The path of this moving point lies between two other variables, confiscation and exorbitance, moving in the same plane. These paths are all relative and their positions at a given time depend upon the experience of corporations which have attained success through ingenuity and efficiency.

Reasonable rate of return thus defined and thus used in rate-making amounts to a statement to the public and to the

utilities by regulatory bodies that, under reasonable rates, the maximum earnings of a utility should bear some relation to the maximum earnings of other stable and successful corporations, and the minimum earnings of a utility to the minimum earnings of such corporations.

Under our system of government, the rate-making power is a legislative function. The details of rate-making are carried out by regulatory bodies created for that purpose. The acts of these bodies are subject to judicial review for the purpose of determining whether constitutional rights have been violated. Usually the acts of the regulatory bodies are brought under review on the grounds that the rates prescribed are confiscatory. Above this lower limit lies the zone of reasonableness within which regulatory authorities function. It is their duty to establish rates which will produce a return within this zone high enough or low enough to accomplish the purposes for which agencies of control were established. Among these purposes are the reward of efficiency and the penalizing of inefficiency.

This brings us back to the main theme of this paper. The procedure outlined furnishes one method of determining just what point within the zone of reasonableness is most reasonable at a given time under the conditions existing at that time.

Those regulatory authorities who look upon reasonable return as a variable lying between the two variables, confiscation and extortion, are more likely to establish schedules of rates whose reasonableness can be demonstrated by the test of actual experience.

RECENT CHANGES IN FARM ORGANIZATION IN WESTERN CANADA

By J. E. LATTIMER

THE post-war depression in the farming industry has been fairly general and the farm problem almost world-wide. This was conceded in the agenda of the World Economic Conference of May, 1927, which raised for discussion the questions of why the purchasing power of those engaged in farming compared so unfavorably with the purchasing power of those engaged in other industries and how the purchasing power of farmers might be increased.

On account of the general prevalence of what has become known as the farm problem, census returns since the depression began are of unusual interest. Census returns are at least a fairly candid admission of facts. The Census of Canada for 1926 covers only the three Canadian provinces of Manitoba, Saskatchewan and Alberta. The area covered by these three provinces, referred to frequently as the prairie provinces, occupies a rather important place in the agricultural industry. For this reason the development in this area during the half decade from 1921 to 1926 may be of considerable interest, as revealing how farmers in that section have reacted toward the farm problem of the period. It is proposed to present briefly some of the changes which have taken place in farm organization in these provinces during the half-decade.

Returns of the census reveal that considerable expansion has occurred in this area during the five-year period of this depression and it is of peculiar interest to examine the nature of that expansion.

Manitoba

In the province of Manitoba the number of farms has remained prac-

tically stationary during the period, the number of farms being 53,252 in 1921 and 53,251, or one less, in 1926. The farm population, however, shifted considerably in different sections of the province. These provinces are divided into fairly regular divisions for census purposes. In considering the divisions we find that one (No. 12), located toward the north of the province between the two lakes, had 1,109 fewer farms in operation in 1926 than it recorded five years earlier. In this division in 1921 the improved land amounted to only 20 acres per farm. The southern part of the province records an increased number of farms in operation in 1926 compared with 1921, the increase being marked in the vicinity of Winnipeg. The shift of farm population in this province indicates some tendency to abandon land which may under present conditions and in its present stage of development be considered submarginal. During the half-decade the occupied area of land in the province decreased by 204,247 acres, while the improved area was increased by 288,198 acres and the cropped area by 403,782 acres. The net result has been the abandonment of land inferior with respect to location or in other ways, and concentration on lands in the southern section of the province, particularly near the chief market.

Saskatchewan

The province of Saskatchewan records a somewhat different development during the period. In this case there is a very decided trend in the direction of enlarging the area per farm. This

province, with 1,664 fewer farms in 1926 than in 1921, increased the occupied area by 1,992,058 acres and the improved area by 2,676,644 acres, and added 1,736,098 acres to the cropped area. This was done by adding 22 acres to the total area per farm, 26 acres to the improved area and 17 acres to the cropped area per farm.

Alberta

A similar development is recorded in Alberta for the five-year period. In this province there has been considerable shift in the farm population during the interval. All the southern part of the province, except the division containing the irrigated areas, reported fewer farms in operation in 1926 than five years earlier. The Edmonton district had a greater number of farms in operation in 1926 than in 1921, while the northern outlying districts reported a decrease in number of farms operated in the latter year. Part of this shift in farm population has been facilitated by providing more favorable locations in the Edmonton district for settlers who preferred to leave the somewhat arid southern area of the province. Part of this shift in farm population is the result of an endeavor to correct some of the past errors of land settlement, which has necessitated some expense to the public.

The province of Alberta with 5,824 fewer farms in operation in 1926 than in 1921 decreased its occupied area by 720,122 acres. During the same period the improved area was increased by 1,536,114 acres and the cropped area by 643,510 acres. With 7% fewer farms in operation in 1926 than five years earlier the improved area has been increased by over 1,500,000 acres and the cropped area by over 600,000 acres. This has been done by the addition of 18 acres to the total area, 30 acres to the

improved area, and 16 acres to the cropped area per farm. In one division the average size of the farm in 1921 was 406 acres, while in 1926 this division recorded an average area per farm of 533 acres or an increase of 127 acres per farm in the five-year period. This is a rather rapid reorganization of the business.

Various Methods of Meeting the Farm Problem

The different trend noted in Manitoba from that apparent in the other two provinces demonstrates that there are at least two methods of meeting the farm problem of declining prices. The development in Manitoba has been a modification in the type of farming. The development in the other two provinces has been a definite tendency to enlarge the acreage operated. That these sections should develop differently is only to be expected when one considers the differences in the stage of development, in the proximity to markets and in the type of farming carried on. Manitoba, an older settled region with more permanent improvements and more generous rainfall, decreased the area devoted to wheat during the interval. With a more diversified system of farming than prevails at present farther west, reorganization in the industry has taken place more with respect to the type of farming than to the size of the unit.

Each of the other two provinces increased the area devoted to wheat growing and also materially increased the size of the units operated. The net result of the five-year period for the three provinces together has been 7,489 fewer farms in operation, while the area occupied has increased by about 1,000,000 acres, the improved area by over 4,000,000 acres and the cropped area by 2,750,000 acres.

Fewer Farms Producing More

Fewer farms were in operation in 1926 than in 1921 yet the occupied, improved and cropped area materially increased. This is particularly noticeable where grain growing is at present the predominant activity. As one writer has described it, the farmer has increased his floor space.¹ What has been termed the mechanized agriculture² which has evolved on the continent of North America has made this development possible.

Is this trend during the past five years based on sound economic principles? The value of the different factors of production during that period in Canada would appear to warrant this trend. The price of farm land per acre in Canada was the same in 1923, and in 1926 for that matter, as it was in 1914. The price of capital or the rate of interest now approximates the 1914 level. In the meantime the price of farm labor became almost twice as high as it was in 1914. If we economize or use sparingly the factor which is the most expensive, then what trend might we expect? If the combination of labor, land and capital was satisfactory in 1914, then what readjustment would be logically anticipated under these changed conditions? Would it not be the more liberal use of land and capital in comparison to the labor employed? This is just what has been taking place.

Mechanized Agriculture

This is by no means a new development. This movement has been noticeable for the past half century in some regions. It has been particularly marked

in Canada during the present century as Table I and Chart I illustrate.

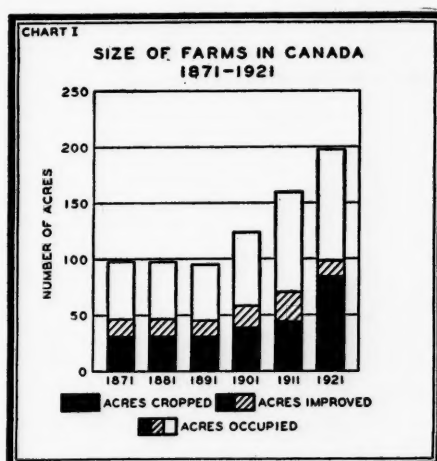
These figures show that during the late decades of the past century the industry was fairly stable in Canada.

TABLE I. SIZE OF FARMS IN CANADA, 1871-1921*

Year	Acres Occupied	Acres Improved	Acres Cropped
1921.....	198	99	84
1911.....	160	71	45
1901.....	124	59	39
1891.....	95	46	32
1881.....	98	47	32
1871.....	98	47	32

*Data from Census Reports and Canada Year Books.

Farms were 100 acres or less in size, the improved area not quite 50 and the cropped area only 32 acres per farm. With only about half as many farms in operation in 1871 as Canada now has and with a population of less than 4,000,000, the imports of farm products practically balanced exports during the decade from 1870 to 1880. In 1901 with less than 5,500,000 people in the country and over 40% of the gainfully employed engaged in farming, the surplus of exports over imports of farm products amounted to some \$50,000,000. In 1921



¹ R. D. Colquette, "Farmers Increase Their Floor Space," *Grain Growers Guide*, Winnipeg, Nov. 15, 1927.

² W. A. Riddell, "Influence of Machinery on Agriculture in North America," *International Labor Review*, Mar. 1, 1926.

with a total population of almost 9,000,000 and less than 33% of the gainfully employed engaged in farming, the surplus of exports over imports of farm products amounted to some \$350,000,000 or seven times greater than 20 years earlier. In 1926 the surplus of exports over imports of farm products was given as \$544,000,000. This is just about 10 times the value of the surplus 25 years ago.

The change in the price level must be considered in comparing values. This accounts for part of the increase. The price level has changed considerably since 1901 but it is perhaps an interesting and peculiar coincidence that the wheat crop of 1871 was valued at \$1.02 per bushel, while the estimated farm price of the 1927 wheat crop is precisely the same figure. The necessity of adjusting for a change in the price level depends to a great extent upon what article or commodity is involved.

The outstanding points, after allowing for the change in prices, are that fewer farms, comparatively, are producing more and comparatively fewer workers in the industry are now producing more. In 1901 there were some 511,000 farms and 716,860 persons engaged in the farming business; in 1921 there were 711,000 farms and 1,041,618 engaged in the industry. Though population has nearly doubled in the interval the surplus of exports over imports has become about 10 times as great. In 1927 the number of laborers required for the western grain harvest was 25,000 men. The same issue of the Montreal Gazette which made this announcement also stated, in its column devoted to happenings of 25 years ago, that the requirement for the western harvest then was 25,000 men. The wheat crop of 1901 was 55,000,000 bushels. The wheat crop of 1927 was 440,000,000 bushels,

or just eight times as large, and yet practically the same number of transient laborers were required. The explanation is the increased use of machinery and power. It has been pointed out that 170 combines were in use in Western Canada in 1926 and during 1927 this number was increased by some 500, while the use of motor trucks for hauling grain has become common. Fewer men are accomplishing more.

Further evidence of this trend is found in the rapid increase of production per farm and per man during the present century. In 1901 the number of acres cropped per worker was 27.6, while in 1921 it was 57.2 acres or over twice the area. The increase in the production of farm products has been much greater than the increase in the number of farms operated or in the number of workers engaged in farming as Table II reveals.

TABLE II. ESTIMATED VALUE OF FIELD CROPS PER FARM IN CANADA, 1871-1921*

Year	Number of Farms	Aggregate Value	Value per Farm
1921.....	711,090	\$931,863,670	\$1,315
1911.....	682,329	384,513,795	564
1901.....	511,073	194,953,420	381
1871.....	367,862	111,116,606	302

*Data from Dominion Bureau of Statistics.

These figures show that the greatest increase in value of products in the aggregate and per farm was during the decade between 1911 and 1921, a decade when very few farms were added to the total number. In other words, production per farm is not so great during periods when new homesteads are being brought into cultivation. The difference in the price level between 1911 and 1921 must also be considered. But farm products were not very high in price in 1921, as we shall note later. With all necessary allowances the significant revelation here is that fewer farms are pro-

ducing more and that the expansion of the industry during the decade between 1911 and 1921 was in the direction of increasing the production per farm rather than adding to the total number of farms.

These figures show that the movement during the half-decade from 1921 to 1926 in the western provinces of Canada was the continuation and perhaps the acceleration of a trend which was well under way during the previous decade. This fact warrants further investigation. The figures in Table III for the past 14 years are of interest.

TABLE III. CROPPED ACREAGE, CROP VALUES, AND PRICE INDEXES OF FARM PRODUCTS, PRAIRIE PROVINCES OF CANADA, 1913-1926

Year	Acres Cropped Million*	Crop Value Million*	Index of General Prices†	Index of Prices of Farm Products†
1913	19	\$241	100	100
1914	17	278	102.3	110.6
1915	22	451	109.9	124.1
1916	24	518	131.6	143.4
1917	26	664	178.5	207.7
1918	30	593	199.0	212.3
1919	32	652	209.2	232.5
1920	32	609	243.5	258.2
1921	38	371	171.8	164.2
1922	37	489	152.0	138.5
1923	37	475	153.0	127.6
1924	38	533	155.2	139.1
1925	38	674	160.3	160.5
1926	37	640	156.2	160.0

*Canada Year Books.

†Prices and Price Indices, 1913-1926, Ottawa (1927), p. 29.

During the 13-year period from 1914 to 1926, inclusive, the prices of farm

products were above the general price level in nine and below the general level in the other four years. The increased acreage in response to better price ratios is apparent. The value of field crops reached its maximum in 1925. This maximum value was the product of 38,000,000 acres, while the second largest aggregate value occurred in 1917, the product of 26,000,000 acres. In other words, by the cultivation of 12,000,000 more acres the aggregate value has surpassed slightly the maximum reached during the war period of high prices of farm products. The five-year period from 1916 to 1920 records an average annual value of field crops of almost exactly \$100,000,000 more than the average of the succeeding five years. The total value of field crops during the last two years of the period reached a comparable basis with the war years only on account of the fact that larger areas were being cropped. The increased acreage has not been brought about by adding to the number of farms in the last half-decade as the figures in Table III indicate.

For the census year we have the number of farms in operation and the acres in field crops. The latter figure is slightly different from the total cropped area, the figures previously used. By calculation we may secure a fairly accurate figure for the value of field products per farm for the census years (Table IV).

TABLE IV. SUMMARY STATISTICS ON AGRICULTURE BY YEARS IN PRAIRIE PROVINCES OF CANADA 1911-1926*

YEAR	NUMBER OF FARMS	TOTAL ACREAGE OF FIELD CROPS (MILLIONS)	AVERAGE SIZE OF FARMS			AVERAGE VALUE OF FIELD CROPS PER FARM
			Acres Occupied	Acres Improved	Acres Cropped	
1926	248,168	35	358	199	141	\$2,570
1921	255,657	32	344	176	126	1,450
1916	218,563	25	335	157	113	2,371
1911	199,203	18	294	115	89	1,207

*Data from Census Reports.

These figures demonstrate why the number of farms decreased in the last half-decade. Other important points are revealed in these census returns. One of these worthy of special attention is the fact that even when the number of farms in operation decreased the acreage expanded. This was made possible by enlarging the area of the unit, a tendency already mentioned. The growth of the farm in the last 15 years is presented in Chart II.

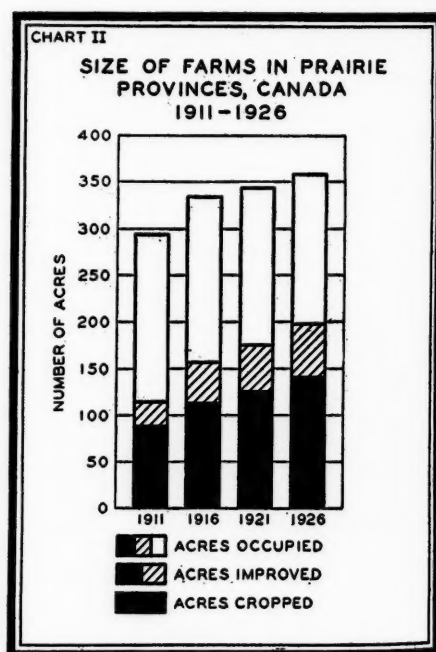
The past 15 years record a steady growth in the size of the farm when considering the prairie provinces together, but as already noted, Manitoba is an exception to this rule. The increase in the improved area per farm has been even more marked. The cropped area per farm has increased from 89 acres to 141, or 52 acres in the 15 years. The increase in the average size of farms has been pronounced during the past five years at the same time that the number of farms in operation decreased. In the five-year period from 1921 to 1926 the improved area per farm was increased by 23 acres and the field crop area increased by 15 acres. This may not appear to be a very great change but it may be pointed out that in one province in the Dominion, where the type of farming is entirely different, the area in field crops per farm in 1921 was only 14 acres. This comparison affords further evidence, if such is required, that it is disastrous to expect or attempt to establish a similar system of farm organization where conditions vary.

The records also show that there is still ample opportunity for considerable expansion without increasing the number of farms, as the unimproved land per farm still averages 159 acres. The outstanding fact which all the evidence at hand appears to establish is the very slight relationship between the number

of farms and the area cultivated or the results obtained. This brings us to a consideration of the proportion of the population required in the farming industry.

Ratio of Farms to Population

Increased production from a smaller number of larger and better equipped farms leads inevitably to a decreased proportion of the population directly engaged in farming. This tendency is viewed with alarm in some quarters. Is there anything alarming about this trend so long as production of farm products is maintained? Society is interested in securing food as well as other necessities with a constantly decreasing expenditure of effort. Indications are that parts of the world are certainly, if slowly and spasmodically, moving in this direction. Many people are also interested in another apparently laud-



able desire, namely, that those engaged in farming should enjoy a reward for their efforts and a standard of living comparable to those enjoyed by other industrial groups. The realization of both these aims necessitates an ever-decreasing proportion of the population engaged in farming.

The economical production of farm products requires only a comparatively small proportion of the population to be engaged in the farming industry, provided that those in the business are equipped to produce efficiently. This is apparently the only method which may insure a standard of living on the farm comparable to that enjoyed in other callings and at the same time provide farm products economically. How do we know that this is possible? The evidence comes not from speculating as to what *may* be but rather from observation and analysis of what *is*.

The organization of the farming industry varies in different sections of the world. This organization also may vary at different periods in the same section. The proportion of the population engaged in farming varies from country to country and from time to time. Russia reports about 20,000,000 farms³ and about 146,000,000 people or approximately one farm to each seven people. Is Russia a great contributor to the world's food supply or is Russia safe from famine? Exports of wheat from Russia for the current year are estimated at 10,000,000 bushels.⁴ France with over 5,000,000 farms and 40,000,000 people has one farm for every eight people in round numbers. Is that well-farmed country noted for its contribution to the world's food supply or for the

high standard of living of the farmers of the country? Denmark with 205,000 farms and 3,250,000 people has one farm to every 15 persons.⁵ And Denmark contributes materially to the world's food supply. The United States with 6,371,640 farms⁶ and about 120,000,000 population has one farm for every 19 people. Yet there appears to be no lack of food at present. In fact, the United States appears to have a greater surplus of farm products with 26.1% of the gainfully employed engaged in farming, as in 1920, than 100 years earlier when over 73% were engaged in farming.⁷ Canada with some 700,000 farms and less than 10,000,000 population has one farm for every 14 people; yet the exportable surplus of farm products is the most important item in the national economy. Australia with 62% of its population classed as urban⁸ has one land holding for every 22 people approximately. If rural depopulation is ipso facto alarming on account of impending famine, then we might imagine that it would be necessary to send food products to Australia with all despatch. Instead of this we appear to be quite alarmed at the competition of food products from Australia in our own markets.

Within certain limits and up to a certain point it appears that the smaller becomes the proportion of the population engaged in farming the more economically will farm products be produced, provided that the farms are equipped to permit efficient operation. If and when the proportion of the popu-

³ C. L. Christenson, "Agricultural Cooperation in Denmark," United States Department of Agriculture, Department Bulletin 1266, p. 2.

⁶ United States *Census of Agriculture*, 1925, p. 3.

⁷ J. Perlman, "The Recent Recession of Farm Population and Farm Land," 4 *Journal of Land & Public Utility Economics*, 45-58 (Feb. 1928).

⁸ *Year Book of the Commonwealth*, 1928.

³ W. M. Tcherkinsky, "The Position of Russian Agriculture," *Economic Journal*, Sept. 1925.

⁴ "Foreign News on Wheat," United States Department of Agriculture, Bureau of Agricultural Economics, Feb. 23, 1928.

lation engaged in farming is proportionate to the requirements of farm products, the return to those engaged in the industry may compare with those engaged in other industries. If the industry remains overcrowded, this condition may have several causes. Among them we may include the immobility of labor, the pressure exerted to prevent rural depopulation and the possibility that the pecuniary and non-pecuniary returns in the farming industry are more alluring than is generally admitted.

Many farmers are perturbed over the surplus of farm products. Farmers have no monopoly of this idea. Business appears to be somewhat fearful of overproduction. These are growing pains always keenly felt in transition periods when production is out of balance. The only surplus which appears permanently alarming is the surplus which occurs where two people are engaged in doing what one might just as well accomplish. This lowers individual returns whether it be in an office, in mining coal, or in farming.

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DEPRECIATION—AN OPERATING EXPENSE OR AN APPROPRIATION OF EARNINGS?

By EUGENE L. GRANT

DEPRECIATION accounting procedure varies greatly among different public service enterprises. It departs in a variety of ways from the orthodox accounting plan of making predetermined, periodic depreciation charges on the basis of expired life expectancy, and keeping records of accrued depreciation, in the form of depreciation reserve accounts for individual assets. Among the variations from orthodox procedure we find such devices as blanket depreciation reserves for each class of assets; blanket "retirement reserves," applying to all the assets of a particular company; "retirement accounting," involving the charging of the original cost of a retired unit as an operating expense at the time of the retirement; and "replacement accounting," involving the charging of the replacement cost of the retired unit as an operating expense.

Reasons for Variety in Public Utility Depreciation Accounting Methods

Where blanket retirement reserves are used, depreciation charges (or "retirement appropriations") are sometimes made on a predetermined unit basis such as a specified amount per kilowatt hour generated or a basis which bears some relation to the investment in fixed assets; or they may be varied at the discretion of the management. The aim of the annual depreciation charge may be the orthodox accounting goal of measuring expired life expectancy, or it may be the provision of sufficient funds only for average annual property retirements, so

that the retirement reserve is only a retirement suspense account with even the possibility of occasionally having a debit balance.¹ Probably a great many public utilities in their actual practice are shooting at a mark somewhere between these two limiting objectives.

It seems probable that these various departures from orthodox accounting theory have often been motivated by practical considerations, which in some cases have been widely removed from the theoretical arguments advanced to support the procedures adopted. Some of these motives have been related to accounting convenience. In this respect, for instance, the practice of the railroads in charging replacement costs of ties and rails as operating expenses has distinct advantages over the orthodox accounting procedure.

Another important motive probably has arisen out of the relation between the accounting and the rate-base aspects of depreciation. Orthodox accounting theory assumes that the cost of any asset is merely a prepaid expense which, because it happens to apply to more than one fiscal period, should be distributed over the life of the asset by means of depreciation accounting. On the other hand, public utilities have generally contended in rate cases that a public utility property is a single unit of fixed capital with perpetual life, and that if the property is properly maintained there need be no depreciation. In other words, the usual public utility contention is that the only kind of depreciation which need be considered in determining the rate-base

¹ In his testimony before the Interstate Commerce Commission in the original hearing on Order 15100, the late Robert A. Carter of the Consolidated Gas Company

of New York stated that in his opinion there was no reason why a retirement reserve should not occasionally have a debit balance.

is the kind which is a result of inadequate maintenance. To be consistent, this view would seem to imply retirement or replacement accounting, or a retirement reserve which is essentially a retirement suspense account.

But perhaps the most important motive which has influenced utility managers in favor of unorthodox depreciation accounting has been the desire to adjust retirement charges from year to year in accordance with financial needs. This has been recognized in the Interstate Commerce Commission opinion on Orders 14700 and 15100 with regard to depreciation charges of telephone companies and steam railroad companies.²

Flexible Retirement Charges

In the gas and electric field this motive has led to the development of the "flexible" retirement reserve by many companies. Thus, if earning statements of gas and electric companies are examined, instead of saying "Operating expenses, including depreciation," they will frequently include no allowance for depreciation in operating expense, but will come out at the end after interest and all other charges have been met with a "Balance available for reserves, retirements, and dividends." The annual depreciation or retirement charge is thus apparently an appropriation of profits, and is frankly variable with net earnings.

This method of flexible retirement reserve accounting has an able spokesman in Mr. L. R. Nash who has eloquently defended it in his excellent book, "The Economics of Public Utilities," and in numerous periodical articles. His main point in its favor has been the importance to public utility credit of a uniform dividend rate, which may be facilitated

by a flexible retirement charge. Mr. Nash has written as follows regarding the possibilities of this plan:

"In periods of prosperity the appropriations might be such that they would tend to bring the reserve to its upper limit. In periods of depression the appropriations might with equal propriety be curtailed with the lower limit of the reserve as the temporary goal. Under conditions of unusual prosperity or depression there might be even wider fluctuations in the appropriations, if in the long run the goal of accumulated reserve was aimed at with consistent fidelity."³

It is not the purpose of this article to enter into the general aspects of the public utility depreciation accounting controversy. However, it seems worth while to examine critically the contention that it is important to public utility credit to show the depreciation or retirement charge as an appropriation of earnings rather than as an operating expense, and to make this charge variable with earnings rather than a relatively constant figure dependent on a predetermined rate. Doubtless the managers of all public utilities using this unorthodox accounting procedure would include an allowance for depreciation or retirements as an operating expense in any rate-hearing before a regulatory body.⁴ Thus this procedure is frankly an accounting fiction, and an important consideration is whether the practice serves the purpose for which it is designed, and whether in some instances it may not eventually prove a boomerang to the utilities using it. Finally, what is the effect of the flex-

⁴ For instance, the Northern States Power Company which reports in its earning statements "Balance available for reserves, retirements, and dividends" (although its retirement appropriations have shown no such marked fluctuations as those of some other utilities using the flexible retirement appropriation method) was allowed a 2.4% annual retirement expense in a hearing before the Wisconsin Commission. See *Re Northern States Power Company*, P. U. R. 1926 C 46.

² 118 I. C. C. 295.

³ "Public Utility Depreciation Accounting," 2 *Journal of Land & Public Utility Economics*, pp. 369-384 (October, 1926).

ible retirement charge on the interests of the bondholders and the consumers?

A flexible depreciation or retirement charge has been defended on the ground that it may be used to maintain the dividend rate on common stock at a constant figure through periods of high and low earnings, and thus improve utility credit. If this defense is employed, then in what situations will the maintenance of the dividend rate require that the annual depreciation or retirement charge be decreased below its normal figure?

A well-managed utility may conceivably find its net earnings decreasing for any one of several reasons, which may be related to an increase in operating expenses, or to a decrease in revenues, or possibly both. Operating expenses may be enhanced by some sudden uncontrollable cause, such as a coal strike increasing the expenses of a steam-electric utility or a gas company, or a year of abnormally low run-off increasing the expenses of a hydro-electric utility. Or they may be increased by a gradual rise in the costs of labor and materials. Revenues may fall off on account of an industrial depression in the community served, or a fundamental change in public demand, resulting perhaps from such a cause as the competition of a substitute commodity or service.

Instances of a change of the last type may be found in many communities where the automobile has caused a decrease in the demand for street railway service to such a point that no rate could yield a fair return on the investment. In such cases the manipulation of a flexible depreciation or retirement charge below its normal figure, in order to continue paying dividends, is probably a highly undesirable procedure from the standpoint of the bondholders and the public. Such reduction of the depreciation charge may, of course, serve the stock-

holders' immediate ends by repaying them part of their investment after their equity is already gone, and it may assist them in unloading their holdings at more than they are actually worth.

On the other hand, if the reduced net earnings are a result of some cause which requires an upward readjustment of rates as a remedy, the maintenance of the apparent earnings available for dividends by means of depressing the depreciation or retirement charge below its proper average figure may seriously handicap the utility in securing the needed rate readjustment, when its case is presented to the regulatory commission. The fact that the utility was showing apparent earnings sufficient to maintain the dividend rate at the previous figure might interfere with a commission's willingness to permit a higher rate-schedule. Certainly this would be true to the extent that the commission's decision was influenced by the political aspects of rate-increases, as distinguished from the true equities in the situation which might appear only after careful analysis.

If there is any justification for the use of the flexible retirement charge to maintain dividends, it rests on the clearly temporary nature of the reduction in net earnings which may result from such causes as a coal strike, an unusually dry year, or temporary industrial depression. But the meeting of just such situations is one of the important reasons for the retention of a portion of profits as surplus, rather than declaring all profits as dividends as soon as earned. The latter practice tends to transfer the risk of temporarily reduced earnings from stockholders to fixed-return investors and consumers.⁵ Moreover, the necessity of

⁵ To the extent that the period of reduced earnings coincides with a period of reduced demand, and/or reduced burden on the property and hence less need for retirements, some lowering of retirement appropriations may be justified from the standpoint of consumers.

reducing the depreciation or retirement charge below its average figure through such a temporary depression period, in order to maintain the previous dividend rate, implies that there are no undivided profits in the form of corporate surplus. A corporation with an adequate surplus has no need of the flexible depreciation or retirement charge to enable it to maintain its dividend rate through an obviously temporary period of reduced net earnings.⁶

The importance of a public utility plowing back a certain percentage of its earnings into the business rather than declaring them all as dividends is generally recognized. The practice has a favorable effect on public utility credit, and the contention of utility managers that utility earnings should be at a level which will permit this is undoubtedly sound. The implication that this plowing back of earnings will not take place is a serious defect in the case presented by the advocates of the flexible retirement appropriation.

Flexible Retirement Charges in Relation to Public Utility Credit

Finally, to what extent may public utility credit really be improved by the flexible retirement appropriation, in the

instances in which it may come into play as a stabilizer of the dividend rate? Such an improvement of public utility credit must depend either on the superficial nature of analysis by investors, or on the effect of provisions in state laws restricting the character of investments for such institutions as savings banks and insurance companies.

Investors in common stock naturally prefer a uniform dividend rate. A constant dividend rate implies stability of earnings, and this implied stability of earnings may improve the market for other securities than the common stock, to the extent that investors consider the dividends actually being paid instead of analyzing the underlying situation. For instance, a certain electric utility recently maintained its common stock dividend through a two- or three-year depression period by a very low retirement appropriation (about 0.1% of the book value of the property) and successfully financed the completion of a new power plant by the sale of bonds and preferred stock. Doubtless the maintenance of the common stock dividend (which was passed shortly after the completion of the new power plant) materially assisted in the financing, although it would be very difficult to place a quantitative value on this effect.

⁶ If we accept orthodox depreciation accounting theory for public utility properties, the payment of dividends which could not be paid except by the reduction or the omission of the normal depreciation charge is open to the serious criticism that dividends are being paid out of capital. The New Jersey Commission suggests this in its opinion in *Re Public Service Railway Company* (P. U. R. 1918 E 910):

"In the year 1917 the appropriation for depreciation reserve, which should have been credited thereto, was depleted to the extent of over \$500,000 and used to pay dividends.

"To divert to the payment of dividends money credited to or which should go to the credit of this reserve, and so destroy the assurance of the continuance of safe, adequate and proper service, is wholly unjustified and a violation of the paramount duty of the utility.

"If the earnings of a utility will not admit of the maintenance of a proper depreciation reserve and a fair

return upon the property used and useful, the remedy is not to be found in the reduction of the amount carried to or the depletion of the depreciation reserve, but in a prompt application to this Board for relief."

See P. U. R. 1920 C 505 and P. U. R. 1922 C 248, for similar comments by the Nebraska and Oregon Commissions.

But, of course, the flexible retirement appropriation starts with the assumption that a public utility property is a single unit of fixed capital with perpetual life, that retirement costs are merely maintenance costs, and that a retirement reserve is essentially a maintenance suspense account. Even if we accept these assumptions as valid, the reduction of the retirement appropriations below the average retirement cost in order to maintain dividends is open to criticism as a departure from conservative financial policy.

Savings bank investment laws in a number of states require that the common stock of a railroad or other type of public service enterprise shall have paid dividends of a certain amount for a specified period of years as a condition precedent to eligibility of the company's bonds for savings bank investment. Examination of the provisions of such laws as reported in the State and City Department of the *Commercial and Financial Chronicle* indicates that restrictions of this character exist in New York,⁷ New Jersey, Massachusetts, Rhode Island, Connecticut, Michigan, Wisconsin, Minnesota, Florida, Washington, North Dakota and New Mexico. These restrictions apply more frequently to railroad bonds than to bonds of other types of utilities. New Hampshire and Ohio have similar provisions with respect to the eligibility of stocks for savings bank investment. Clearly, where such laws exist, utility credit would have been adversely affected if a relatively constant depreciation charge interferes with dividend payment, while a flexible charge allows it. This unfavorable effect on public utility credit would take place to the extent that the rate at which the utility can borrow money is increased by the resulting ineligibility of the utility's bonds for savings bank investment. One may seriously question the wisdom of such laws as a real protection to the savings bank depositor, however, if their result is to weaken the security behind the bonds by encouraging the use of a

variable depreciation charge, which allows the payment of dividends when with a predetermined depreciation charge such payment would more than wipe out the utility's surplus.

The alternative to requiring the payment of dividends for a period of years as a condition precedent for eligibility seems to be the establishment of a certain relation between "net earnings" and interest requirements of the funded debt. (Of course, both types of restriction may be inserted in one law.) In such laws net earnings are usually not adequately defined so as to indicate whether they shall be computed before or after provision for depreciation. However, the recent New Jersey law is explicit, stating that net operating revenues "after all operating expenses, but before deducting charges for depreciation and renewals and Federal taxes," shall have averaged two-and-one-half times average annual interest requirements for the past three years.⁸ The Maine law, on the other hand, states that net income "shall be determined after deducting all operating expenses, maintenance charges, depreciation, rentals, taxes and guaranteed interest and dividends."⁹

Conclusion

The fundamental justification for the flexible retirement appropriation is, therefore, the maintenance of public utility credit through a temporary depression, and it may be used effectively for this

⁷ The recent bill broadening the restrictions on savings bank investments in New York State, which was signed by Governor Smith on March 21, 1928, contains the following provisions with respect to eligibility of bonds of gas and electric companies: "for a period of five fiscal years next preceding such investment . . . such corporation shall have for each such year either earned an amount available for dividends or paid in dividends an amount equal to four percentum upon a sum equivalent to two-thirds of its funded debt." The provision with respect to the eligibility of bonds of rail-

roads and telephone companies provides for having earned or having paid as dividends at least 4% on the outstanding capital stock. See 126 *Commercial and Financial Chronicle* 1864 (March 24, 1928). This is an amendment to Laws of 1914, ch. 369, sec. 239.

⁸ Laws of 1926, ch. 305, sec. 5. See also 124 *Commercial and Financial Chronicle* 3102 (State and City Department) (May 21, 1927).

⁹ R. S. 1916, ch. 52, sec. 27 VII, b 5 as amended. See also 124 *Commercial and Financial Chronicle* 3661 (State and City Department) (June 18, 1927).

purpose. Perhaps in a few instances the long-run interests of the bondholders and consumers may be served by the maintenance of common stock dividends which would have to be passed if uniform depreciation or retirement charges were used, but the danger from the bondholders' standpoint is that public utility managers operating under this system will be likely to consider every depres-

sion temporary, until it has proved otherwise, and continue as long as possible to pay dividends at the expense of the protection of the bondholders' investment. Such a policy might easily force a receivership and reorganization which otherwise might be avoided, and therefore result in losses to the utility's bondholders and discomfort to its customers.

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PROPERTY IN THE AIR AS AFFECTED BY THE AIRPLANE AND THE RADIO

By HIRAM L. JOME¹

THE popularization of the airplane and the radio has squarely raised the practical issue as to property in the air. An airplane by its noise or shadows frightens domestic animals causing great damage to the farmer. An aviator is forced down by a storm, attracting numerous visitors who ruin fences and trample upon the vegetation. Owners of the land adjacent to air-dromes construct buildings so high as to interfere with the ascent or descent of aircraft. The experimenter with delicate laboratory equipment finds his operations disturbed by radio waves. The Federal Radio Commission refuses to grant a license to a station proprietor who has been operating his apparatus long prior to the passage of the Radio Regulatory Act of 1927. The Commission forces another to shift to a new wave length and a different power.

These scattered illustrations of the actual or potential legal problems incidental to the wide and growing use of

the radio and the airplane show the need for the development of the law to meet such situations. Though the law of the air has been slowly evolving, these precise questions have not as yet been subjected to much litigation. However, the subject is growing in importance both in the United States and abroad, which fact suggests the need for examining historically the concept of air rights as related to their use for transportation and communication.

For centuries the problem of property in the air was concerned with the area near the ground. Such questions as arose in regard to trespass in the air² involved shooting,³ or the stringing of a wire,⁴ or the projecting of eaves,⁵ or the spreading of a tree, or the placing of the hand⁶ over another's land. These were generally held to be trespass⁷ on the theory that the landowner has a property right in the air above his holding. To prove trespass it is not necessary to show that actual damage has occurred.

¹ In this article the author considers only the problem of national or municipal law, taking no direct cognizance of the equally important question of the air in international relations. He also wishes to acknowledge the kindness of Professor Lewis M. Simes of the Ohio State University College of Law who has read and criticised the manuscript, but who is not responsible for any opinions expressed herein.

² See the appropriate section in any text or case book on property or on torts. A brief survey of the important cases involving trespass in the lower airspace is given in 6 *Cornell Law Quarterly* 296-7 (March, 1921); 2 *C. J.* 299; 32 *Harvard Law Review* 569 (March, 1919); 26 *R. C. L.* 939; 42 *A. L. R.* 946-9; Broom's *Legal Maxims* (London: Sweet and Maxwell, Ltd.) 9th ed., pp. 260-4. The cases cited in footnotes 3 to 6 are illustrative only.

³ 4 *Times L. R.* 8, 9 (1887). See also Sir Frederick Pollock, *The Law of Torts* (London: Stevens and Sons, Ltd.) 12th ed., pp. 350-4.

⁴ *Butler v. Frontier Telephone Co.*, 186 N. Y. 486; 79 N. E. 716 (1906).

⁵ *Smith v. Smith*, 110 Mass. 302 (1872) (eaves); *Reimer's Appeal*, 100 Pa. Sta. 182 (1882) (bay window encroaching on public highway).

⁶ *Hannabalsen v. Sessions*, 116 Iowa 457; 90 N. W. 93 (1902).

⁷ An unusual case is that of *Pickering v. Rudd*, 1 Starkie 56, 4 Campbell 219 (1815), in which a British judge held that a projecting board did not constitute trespass. He even hints that the shooting over another's land, "no part of the contents touching it," would not constitute trespass. This case has long since been overruled both in Great Britain and the United States, but it is of historical interest in connection with the present topic, because the judge concluded: "Nay, if this board overhanging the plaintiff's garden be a trespass, it would follow that the aeronaut is liable to an action of trespass—*quære clausum fregit* at the suit of the occupier of every field over which his balloon passes in the course of his voyage."

Then came the balloon, the radio, and the airplane. A use of the air even above the tallest structures or trees was discovered. Vehicles of the air brought to the fore the question of the extent of the rights of the landowner and the liabilities of the aviator. The trespass, if such it could be termed, came now from above, and not from the adjacent land. The proprietor of the radio station operating on a preempted or assigned wave length regarded himself as the possessor of squatter's rights. Conferences of European powers have assigned definite portions of the ether to each nation. With the advent of telephonic broadcasting, all the pathways in the broadcasting band in the United States were finally occupied. As an ever increasing stream⁸ of new stations entered the field, interference became common. Though many of the owners had invested tens of thousands, or hundreds of thousands, of dollars, some of them, even while holding a license from the government, found their investment practically destroyed by interference, with an uncertain remedy either at law or in equity.

Evolution of the Legal Concepts concerning Ownership of the Airspace

As to the problem of the ownership of the airspace in relation to aviation, the

⁸ There are 95 wave lengths available in the broadcasting band in the United States and Canada. By a gentlemen's agreement between the two countries, 89 were assigned to the former and 6 to the latter. In these 89 channels more than 500 stations have been operating at all times during the past five years, some sections of the country being especially congested.

⁹ One writer has suggested a "statutory condemnation by act of Congress of all the airspace over privately owned property, giving the owners a right of action against the United States for any damage they might be able to prove." Plan of Judge Lamb described by William R. McCracken in 57 *American Law Review* 99 (Jan.-Feb., 1923), quoted by Edmund F. Trabue in 58 *American Law Review* 65 at 79 (1924).

difficulty seems to center about the meaning and interpretation of the Latin common law maxim, formulated in the early part of the sixteenth century, *Cuius est solum, eius est usque ad caelum* (He who owns the soil, owns it up to the sky). Some law writers translate this very freely and conclude that a landowner has exclusive proprietary rights in all the airspace over his head, and that anybody who passes, or sends his agents or agencies over another's land, at whatever height and regardless of damage, commits an actionable trespass. These authorities maintain that statutory legislation or wholesale condemnation of the air is necessary to give the aviator a right of way.⁹

Other authorities argue that the subjacent landowner has no property whatever in the airspace. They state that balloonists, smoke, sounds, carrier pigeons, and the like have for a long time passed over private property and never yet has the subjacent owner recovered damages for their mere passage without attendant or resultant damage.¹⁰ This

A Rochester, N. Y., state court, in deciding in 1912 that an aviator flying at an altitude of 100 feet without damage to the landowner was liable for trespass, based its decision on the fact that neither the United States nor New York had passed a law legalizing flying in the air above the land held in private ownership. "Therefore, the rule of the common law applies." The judge referred to the fact that France had just enacted such a law. 19 *Case and Comment* 681 (March, 1913); 42 *A. L. R.* 951.

The legal adviser to the director of the Federal Air Service proposed a constitutional amendment or the purchase of air avenues. R. A. Greer, *International Air Regulations*, published by the Chief of the Air Service, Washington, D. C. 1926, p. 29.

Arguments that all flying constitutes trespass are also found in articles in 46 *Canada Law Journal* 730 (1910) and 7 *Ohio Law Reporter* 402 (1909).

¹⁰ It must be recognized, however, that while smoke and sound do not constitute trespass, they may be a nuisance. One technical difference between trespass and nuisance is that in the latter damage must be proved, while in the former the presence or degree of damage is irrelevant.

group regards the air as common property.¹¹

A twofold solution of the problem is possible. The first is to admit that the landowner has in theory full proprietary rights to the airspace, but to point out the fact that "exclusive" does not mean "absolute." According to this argument he holds the airspace subject to a right of passage by aviators, wireless waves, and other agencies of commerce as they take their place in our advancing culture. Aircraft have a legal right to pass through the air, even in the absence of special law, at a reasonable altitude, which depends on the nature of the buildings and obstructions, the type of business of the landowner, and weather conditions, as long as the owner's enjoyment of his life or property is not violated or threatened. If the machine should land regardless of cause, or should fly so near the ground as to damage property or business, or terrify or sicken people or animals, or inconvenience or imperil or actually injure them, the person affected would have the right to damages.¹² According to this theory,

the landowner's exclusive rights extend only as far upward as he can actually use the air or over an area the occupation of which by strangers would damage or tend to damage his person or property on account of wires, smell, noise, shadows, dragging anchors. The proprietor of the land would be permitted to exclude others from the superarea only in so far as he has an interest in so doing.

According to this view, though the aviator has a privilege of passing in the airspace, he has no right of useless hovering or maneuvering. Neither does the right to fly carry with it the right to land, except perhaps in case of emergency. Neither will the right to fly carry with it the privilege of repeated passage. An air transport company operating a hundred machines per day, unless they flew at an unusually great altitude, might be regarded as a nuisance, necessitating the condemnation of an airway. On account of the difficulty of proving negligence, and the fact that the persons on land are powerless to insure their own safety against damages from aircraft the aviator or owner of the craft must

¹¹ The extreme case is the old decision of Lord Ellenborough in *Pickering v. Rudd*, *supra* n. 7, which denied even that an overhanging board constituted trespass. G. D. Valentine in 22 *Juridical Review* 16 at 87 (1910) very ably argues "that the parcelling out of the air between a multitude of persons not only would not benefit them, but would deprive them all of the use of which it is capable." Therefore it should be common to all. The state, however, has an interest in the air, as well as the power to exclude from its use. Therefore, he concludes, the airspace is logically public property.

An attempt was made to insert a provision in the 1927 Radio Regulatory Law declaring the ether to be the property of the Federal Government. The Congress of the Pan American Aeronautic Federation at Santiago, Chile, in 1916 adopted the following as the first of 12 principles to be considered by the Pan American states: "The airspace is to be declared as state property." See Henry Woodhouse, *Textbook of Aerial Laws* (New York: Frederick A. Stokes Company, 1920) p. 12; also R. A. Fixel, *Law of Aviation*. (Albany, N. Y.: Matthew Bender and Company, 1927), p. 19.

Arguing that whatever cannot be occupied cannot be the property of anyone, Hugo Grotius (*Mare Liberum*,

1609) arrived at the conclusion that "the air, the running water, the outer sea or ocean are common to all." See also W. S. M. Knight, *The Life and Works of Hugo Grotius* (London: Sweet and Maxwell, Ltd. 1925) pp. 103-4. It will be noted that Grotius held the occupation theory of property.

"*Aer communis est*" and "*Aer res publicae est*" are ancient adages, probably from the Roman Law. Justinian's *Institutes* contains the following: "By the law of nature these things are common to mankind—the air, running water, the sea, and consequently the shores of the seas." Liber II, Tit. 1, sec. 1 on "*De rerum divisione, et acquirendo earum dominio*." Thomas Cooper's Justinian, (New York: John S. Voorhies, 1852) 3rd ed.

¹² In *Guille v. Swan*, 19 Johnson (N. Y.) 381 (1822) an aeronaut was held liable for damages done by the curious crowds when his balloon was forced to land. That even as early as this the right of flight in the air was recognized is seen from the judge's dictum, "I will not say that ascending in a balloon is an unlawful act, for it is not so . . ." Since aircraft must in flight cover a large area, this is in effect a judicial opinion of the same import as a statutory law legalizing the flight of aircraft.

be held absolutely liable for all damages incurred. When the industry becomes stabilized, this risk may be shifted by means of insurance.¹³

Moreover, the argument continues, ownership and title to an object imply the right of occupation, use, or possession. The upper airspace does not have these important attributes of property.¹⁴ Even though the subjacent owner should possess the title to this superarea, however, his rights are too vague and indefinite to justify state intervention. Furthermore, the maxim was originated at a time when neither the airplane nor the radio was known

and the balloon was not seriously regarded as a practical thing. Its purpose was to protect the landowner in the enjoyment of what he possessed rather than to extend his proprietary rights over space which at that time was not used.¹⁵

Since most law writers seem to agree that some limitation of the so-considered property rights of the subjacent owner in the airspace is needed in order properly to encourage aviation, it becomes necessary under our constitution to justify such modification. The grounds usually advanced are those which fall under the regulation of the police power,¹⁶ public necessity,¹⁷ analogies with the rights of the public on the

¹³ It is conceivable that with the progress of aviation the rule of absolute liability will, as in the case of the automobile, give way to one holding the aviator liable only for negligence. For the arguments for absolute liability see the *Report of the Civil Air Transport Committee* (British), 146 *Law Times* 105-7 (Dec. 14, 1918).

¹⁴ It is possible to have a property right in a certain channel in the ether for the purpose of radio transmission because one may be said to own not the thing, but the right to use or enjoy the thing. Compare H. T. Tiffany, *The Law of Real Property*, (Chicago: Callaghan and Company, 1920), p. 5. It may, accordingly, also be possible for an air transport company to acquire property rights in a particular portion of the airspace.

¹⁵ In accord with some of these general principles of limitation of property in the airspace, see 42 *A. L. R.* 937 at 950 and 32 *Harvard Law Review* 569 (March, 1919). These two references contain excellent annotations of the important cases involving trespass in the air and a discussion of the relative rights of the aviator and the landowner. Also in accord: 4 *American Journal of International Law* 95 (Jan., 1910); 4 *idem.* 109 at 122-8 (Jan., 1910); 6 *Cornell Law Quarterly* 271 (March, 1921); 15 *Law Notes* 169 (1911); 8 *Cornell Law Quarterly* 26 (Dec. 1922); 16 *Case and Comment* 216, (February, 1910); 53 *American Law Review* 711 (Sept.-Oct., 1919); 46 *Canada Law Journal* 480 (August, 1910); Sir Frederick Pollock, *op. cit.*, p. 352; H. G. Tiffany, *op. cit.*, p. 865; B. Davids, *The Law of Motor Vehicles*, (Long Island: Edward Thompson Company, 1911), ch. XIX; Carl Zollman, *Law of the Air*, (Milwaukee: Bruce Publishing Company, 1927) pp. 12-5; H. D. Hazeltine, *The Law of the Air*, (London: University of London Press, 1911), second lecture; J. M. Spaight, *Aircraft in Peace and the Law*, (London: Macmillan, 1919) p. 55; R. A. Greer, *op. cit.*, ch. XI, pp. 32-33. Greer's pamphlet also contains a portion of the report of the special committee of the American Bar Associ-

ation appointed to study this problem. Here also the reader will find a copy of the opinion of Judge John C. Michael of a Minnesota district court, discussed later in this article (p.252).

In 2 *Wisconsin Law Review* 58 (Oct., 1922) is a note concerning a Pennsylvania unreported case. The plaintiff living near a flying field which some gypsy fliers had rented complained of the noise and had the aviators arrested under the game laws which forbade trespassing on land that is posted. The judge held that though the aviators had flown above the plaintiff's land, they had not set foot upon his ground and had therefore not violated the law. It must be noted that this was a criminal, not a civil case, and it cannot, therefore, be used as authority for saying that an aviator is not a trespasser. See also 71 *Pennsylvania Law Review* 88 (Nov., 1922).

¹⁶ Laws limiting property in the air have been said to be similar to statutes and ordinances forbidding the construction of buildings above a certain height. The analogy is not sound, because the limitation of the height of building may be justified on account of the public health and safety—two considerations which cannot be resorted to in justifying limitation of property rights in air in favor of the aviator.

¹⁷ The giving or retention of full property rights in the air would hamper the progress of aviation. Travelers who cannot make their way on account of obstructions such as deep snow may with impunity enter the fields adjacent to the highway. (53 *American Law Review* 725.) This article also contains a discussion of other analogies. See also Zollman, *op. cit.* Ch. I. A ship at sea in a storm may tie up at a private pier without permission. In fact, the owner of such pier would be liable for damages if he refused such use. (*Ploof v. Putnam*, 71 *Atl.* 188 (1908)). The opinion in this case contains a collection of cases on this type of justifiable entry on private property.

waters of a navigable stream,¹⁸ the right of individuals in newly settled districts to graze their cattle and sheep on unenclosed privately owned land,¹⁹ and the fact that the common law must adapt itself to changing conditions.²⁰ The last three seem to be particularly in point.

The easier and more satisfactory but unorthodox method, and incidentally one which arrives at the same conclusion as to the rights of the aviator, is to inquire into the exact meaning of the common law maxim. Law writers have often misunderstood this sentence²¹ and have as a result placed themselves under the necessity of proving either that it does not really mean what their translation states or of showing the necessity of and justification for its limitation.

The common law maxim states that the landowner owns *up to but not including* the *caelum*. What, then, was the *caelum*? Though the word was loosely

used by Latin writers, it was commonly employed to refer to the lower airspace,²² the area in which the birds fly²³ and the clouds drift²⁴ and from which the rain falls and the lightning strikes.²⁵ Occasionally it meant God, "heaven the home of the happy dead," and the resting place of the stars. Birds fly near the ground, storm clouds sometimes hover at an altitude of a few hundred or a thousand feet. It is only up to the beginning of this *caelum* which the landowner owns. Virgil refers to a "*machina aequata caelo*"²⁶—a derrick equal in height to the *caelum*. The machine of which he sings stood on top of a wall. The entire distance probably did not exceed 100 feet.²⁷ Apparently, therefore, according to good Latin usage, the *caelum* was a space which began only a short distance above the surface of the earth. One Latin scholar described it as the space lying only a little above the

¹⁸ The ownership of the bed of a navigable stream generally vests in the government and in rare instances in a private individual. Such ownership, however, is subject to an easement of navigation in favor of the public. The easement is one of *passage* only. See 6 *Cornell Law Quarterly* at 299 (March, 1921). If the bed is privately owned the owner retains exclusive fishing and hunting rights, and any activities on the surface of the water not connected with bona fide purposes of navigation constitute trespass. *Beatty v. Davis*, 20 Ontario Reports 373 (1891) (Queen's Bench, Chancery & Common Pleas Divisions).

¹⁹ Under the common law every man's land was deemed to be enclosed, either by a visible or invisible fence, and every unwarrantable entry on such land constituted trespass. (26 *R. C. L.* 938.) American courts have enunciated the peculiar principle that during the settlement of the more remote parts of the country if anyone left his lands unenclosed, such fact was an implied license to graze stock on them. *Buford v. Houtz*, 133 U. S. 320 (1890) is the leading case. See also *Seeley v. Peters*, 10 Ill. 130 (1848); *Kerwacker v. Cleveland, Columbus & Cincinnati R. R. Co.*, 3 Ohio St. 172 (1854).

²⁰ See 2 C. J. 299 at 302. Our judges "have refused to extend this maxim to untried fields, confining it to that portion of the earth which may be used for trees and structures." Davis, *Law of Radio Communication*, (New York: McGraw-Hill, 1927) p. 18. "The rule or maxim has full effect, without extending it to anything entirely disconnected with or detached from the soil itself." (*Hoffman v. Armstrong*, 48 N. Y. 201 at 204

(1872)). For same effect see *Butler v. Frontier Telephone Co.*, *supra* n. 4. and *Herrin v. Sutherland*, 204 Pac. 328 (1925). The court in the last case (at 332) hints, however, that the question of trespass will become one of great importance when the airplane is common.

²¹ Judge Stephen Davis, *op. cit.* p. 16, translates the maxim as follows: "Whoever has the land possesses all the space upwards to an indefinite extent." A writer in 53 *American Law Review* 728 criticises the common law maxim on the ground that the "landowner might be holding title to millions of acres on planets billions of miles away." These are extreme cases. Practically all writers forget that the Latin says "*usque ad caelum*." (Italics mine.)

²² Plinius and Lucretius Carus refer to the "*caelum, quid aer* (lower air) *dicitur*." Pacuvius says the "*caelum continet terram complexu*."

²³ "*De caelo servare*," a term in augury, referred to a study of the birds, movements, etc.

²⁴ Virgil in *Aeneid* Book I, line 88: "*Eripiunt subito nubes caelumque diemque Teucrorum ex oculis*." Cicero in *Tusculanarum Quaestionum*, Book 1: 19, 43 speaks of *caelum hoc, in quo nubes, imbres ventique coguntur*."

²⁵ The terms "*de caelo tangi*" and "*e caelo ictus*" mean (to be) "struck by lightning."

²⁶ *Aeneid*, Book IV, line 89. Plinius writes about a mountain which extends into the *caelum*.

²⁷ Most of these references are taken from *Thesaurus Linguae Latinae*; Harpers Latin Dictionary (Lewis and Short ed.); Hinds and Noble Latin Dictionary.

highest tree tops and buildings. The area below this *caelum* belongs to the owner of the surface.

Blackstone and Coke, who did much to popularize the common law maxim, interpreted it according to its Latin meaning. Blackstone, after quoting the maxim approvingly says:

".....So that the word 'land' includes not only the face of the earth, but everything under it, or over it. And therefore if a man grants all his lands, he grants thereby all his mines of metals and other fossils, his woods, his waters, and his houses, as well as his fields and meadows."

In another connection he says:

"*Cuius est solum, eius est usque ad caelum*, is the maxim of the law upwards; therefore no man may erect any building, or the like, to overhang another's land."²⁸

It is significant that as careful a writer as Blackstone does not in his specific enumeration mention the airspace or anything pertaining thereto. In the second quotation he refers to "buildings, or the like," overhanging another's land through the air.²⁹

Coke also quoted the Latin maxim:³⁰ "The earth hath in law a *great extent* upwards, not only of water, as hath been said, but of ayre and all other things even up to heaven." In the same connection Coke quoted the Latin "*Caelum coeli domini, terram autem dedit filiis*

hominum." (All the heaven is the Lord's; the earth he has given to the sons of men.)³¹

A strict and careful translation of the Latin maxim will accordingly eliminate the need of proving only a limited ownership of the airspace, for the subjacent landowner by the common law has never possessed even a theoretical right to the area normally traversed by airplanes. While in normal flight the status of the aviator will, then, be governed by the law of nuisance, not trespass.³² To recover damages or to be entitled to equitable relief, a landowner must prove that the aviator constitutes a nuisance. An act or a situation done or maintained on one's own, on public, or on common property may be a nuisance, if the result of it is substantially to harm another's business, property, health, or comfort. A nuisance has been aptly described as the right thing in the wrong place. The test usually is: Does the act or thing harm a person of ordinary sensibilities? Thus, if an aviator's plane, for instance, casts shadows or makes loud noises which frighten a farmer's animals, he may be held to be operating a nuisance, and may be required to fly at a higher altitude. If he flies sufficiently high not to constitute a nuisance, he cannot be regarded as a trespasser, because he has not entered the property of another.³³

word "indefinite" is effectively modified by the context.

³² To commit trespass a person must generally "break the close" by illegal entry or by the projecting of some object upon the land or through the air near thereto. There are instances, also, in which interference with privacy is trespass. In *Hickman v. Maisey*, 1 Q. B. D. 752 (1900), the court held that a newspaperman who loitered on a public road watching the activities of the plaintiff, a horse trainer, was guilty of trespass.

³³ Unless he should drop an article or circle about and break the privacy of the landowner. As soon as the dropped article reached the space below the *caelum* the aviator would become a trespasser, regardless of the damage done. Shooting from a public highway or from one's own property onto or over the land of another constitutes trespass.

²⁸ 2 Commentaries 19 (Oxford edition).

²⁹ H. L. Jome, "Economics of the Radio Industry" (Chicago: A. W. Shaw Co., 1925), p. 232.

³⁰ Coke upon Littleton, (Hargrave and Butler, editors), Lib. I, section I, 4a.

³¹ Obviously Coke is no authority for the statement that man's proprietary rights extend indefinitely upwards. Kent, quoting Coke, says that "land includes not only the ground or soil, but everything which is attached to the earth, whether by the course of nature as trees, herbage, and water, or by the hand of man, as houses and other buildings; and which has an indefinite extent, upward as well as downward, so as to include everything *terrestrial*, under or over it." 3 Commentaries 401 (Charles M. Barnes, editor, 13 ed., Boston: Little Brown & Co., 1884). (Italics mine). Kent's

Obviously the altitude to be maintained and the operating standards to be enforced aboard a plane will depend upon the nature of the subjacent territory.

Modern Legislation Involving Property in Air

The laws covering this subject are of two types: (1) those which have as their purpose the limitation or in a limited sense the condemnation of the rights of the landowner on the supposition that he has theoretical property rights in all the airspace above his head; and (2) those which have been formulated on the theory that the subjacent owner has no property rights, even in theory, in the superarea.

The former type is found in the United States, Great Britain, Japan, Germany and to some extent in France. According to the British Act of 1920, "no action shall lie in respect of trespass . . . by reason *only of the flight* of aircraft at a height above the ground, which having regard to wind, weather, and all the reasonable circumstances of the cases is reasonable." The British Aerial Transport Committee which was appointed to study the problem and whose recommendations were enacted into the above cited law said in its Report:

"To retain this doctrine (*Cuius est*, etc.) in its entirety would be fatal to civil aeronautics. On the other hand, to allow unrestricted flying over private property at all altitudes would interfere with the reasonable rights of landowners."³⁴

The Uniform State Aeronautics Act adopted by 11 American states or territories³⁵ contains the following sections:

Sec. 3. "The ownership of the space above the lands and waters of this state is declared to be vested in the several owners of the surface beneath, subject to the right of flight described in Sec. 4."

Sec. 4. "Flight in aircraft over the lands and waters of this state is lawful, unless at such low altitudes as to interfere with the then existing use to which the land or water, or the space over the land or water, is put by the owner, or unless so conducted as to be imminently dangerous to persons or property lawfully on the land or water beneath. The landing of an aircraft on the lands or waters of another, without his consent, is unlawful except in the case of forced landing. For damages caused by a forced landing, the owner or lessee of the craft or the aeronaut shall be liable, as provided in Sec. 5."

Sec. 5. Providing for absolute liability.

These laws, regardless of the real meaning of the common law maxim, have quite unnecessarily created a property right in the airspace, the justification for the limitation of which must be proved.

Other laws create in an indirect way a property right in the airspace. Section 10 of the United States Air Commerce Act of 1926 defines "navigable airspace" as meaning the "airspace above the minimum safe altitudes of flight prescribed by the Secretary of Commerce . . . , and such navigable airspace *shall be subject to a public right* of freedom of interstate and foreign air navigation in conformity with the requirements of this Act." Section 4 also, by giving the President power to make airspace reservations, appears to classify the remainder of the airspace above a reasonable altitude as free to all.

The Wyoming statute of 1927 (ch. 72, sec. 2,j) stipulates that the term navigable airspace "means the airspace above the minimum altitudes of flight which are hereby defined to be not less than one thousand feet over any city, town, or settlement, and not less than five hundred feet over any other portion of the State of Wyoming except in case of

³⁴ 146 *Law Times* 106 (Dec. 14, 1918).

³⁵ Delaware, Hawaii, Idaho, Maryland, Michigan, Nevada, North Dakota, South Dakota, Tennessee, Utah, Vermont.

landing, taking off or emergencies necessitating lower flight, and excepting lower flight when necessary for industrial operations."³⁶

By stating that the airspace shall be subject to a public right of passage of airplanes, the federal law has admitted the existence of some property rights in the *caelum* even outside of those created by the law of nuisance or of trespass in the lower airspace. The Wyoming and other similar state laws have in a sense condemned a portion of the airspace for the purposes of aviation.

The French Code Civil provided that the airspace belongs to the subjacent landowner, but this presumption may be rebutted.³⁷ In 1913 France passed a law which (sec. 1) "proclaims the liberty of the circulation of airships (including airplanes) above the territory of the Republic under reservation of the observance of the law. . . . It is forbidden that airships shall descend, unless in case of *force majeure*, upon enclosed properties on which there is a dwelling, without the consent of the proprietor. . . . The airships and the aviators will be held responsible for any damage to property caused by aerial navigation, the victim of any damage so caused not being required to show that such damage was caused by any fault on the part of the aviator."

³⁶ The Uniform Act prohibits flying at such a low altitude as to endanger people or property or to interfere with the existing use of the land. Some form of limitation of altitude is also found in Arkansas, California, Connecticut, Kansas, Maine, Massachusetts, New Jersey, Minnesota, Wisconsin.

An interesting constitutional question would arise if an industrial airplane under authority of the Wyoming law should persist in flying so low as to constitute a nuisance. The federal law has created a public right of passage in airspace which it indirectly admits to be private property. Is such condemnation justified by the power to regulate interstate commerce?

³⁷ Art. 552: "La propriété du sol emporte la propriété du dessus et du dessous. La propriétaire peut faire au-dessus toutes les plantations et constructions qu'il juge

In introducing this bill M. Joseph Thierry stated that the commission in charge of drafting the legislation "had been concerned with the import of article 552 of the Code Civil." The conclusion arrived at was that the "propriété du dessus" as qualified did not extend to the atmosphere not susceptible of private appropriation. M. Thierry stated that it was the purpose of the bill, "while protecting the public, not to injure in any way a new national industry."³⁸ This law in effect put to rest all demands of the landowner for proprietary rights in the airspace in return for the provision that the aviator shall be held absolutely responsible regardless of proof of fault on the part of the aviator, for all damage caused either by the circulation or descent of aircraft.³⁹

The German Civil Code provides that "the right of the owner of a piece of land extends to the space above the surface and to the substance of the earth beneath the surface. The owner may not, however, forbid interference which takes place at such a height or depth that he has no interest in its prevention."⁴⁰ The Japanese Civil laws stipulate that "the ownership of land, within the restriction of laws and ordinances, extends above and under the surface."⁴¹

The best illustration of the second type of law is found in Switzerland.

à propos, sauf les exceptions établies au titre des servitudes au services fonciers." Some of the easements and duties in the title referred to (Sections 653-685, Wright Civil Code) provide for rights of way, location of buildings, etc.

Reviere's Code Francais contains a note: "La disposition d'après laquelle la propriété du sol emporte celle du dessus et du dessous, n'établit qu'une présomption, qui cède à une preuve au présomption contraire." (135 *Law Times* 70).

³⁸ 135 *Law Times* 70.

³⁹ For cases decided under this law, see note 47.

⁴⁰ Chung Hui Wang, *German Civil Code*, Sec. 905 (London: Stevens & Sons, Ltd., 1907).

⁴¹ J. E. deBecker, *Civil Code of Japan*, Art. 207 (London: Butterworth & Co., 1911).

According to the Swiss Code, "ownership in land and soil reaches above and underneath into the air and the earth so far as the exercise of the ownership requires." This is a distinct limitation of property rights in the airspace.⁴²

The Argentine Civil Code also seems to illustrate the second group of laws. "The ownership of the soil extends to its entire depth, and to the aerial space in perpendicular lines. It comprises all the objects to be found beneath the soil. . . . The proprietor is the exclusive owner of the aerial space; he may extend his constructions therein, even though they take away the light, view or other advantage from his neighbor; and he may demand the demolition of the works of a neighbor which encroach upon this space at any height."⁴³ It will be noted that while the law uses the term "at any height," it manifestly refers only to buildings and constructions. Section 2554 provides that "the ownership of a thing comprises at the same time the ownership of the things accessory thereto, whether naturally or artificially attached."

Present Status of Property in Air

The evolution of the law away from the concept or theory that ownership extends indefinitely upwards has significance in discussing the legal rights and duties involved in the situations suggested in the beginning of this article. The principles of the law as applied to the airplane and balloon may be summed up as follows: (1) A subjacent owner owns the airspace only up to a limited altitude; (2) In the superarea he has no property rights unless they have been created by statutory legislation; (3)

The aeronaut, or proprietor of the aircraft, is responsible for all damages caused by him or by his descent. For instance, if while 5000 feet in the air, an altitude in which the subjacent landowner has neither practical nor theoretical proprietary rights, the aviator drops a monkey wrench and kills a farmer's calf, or makes a noise frightening animals, the aeronaut is liable regardless of fault. It will be noted that, while he himself was not at first a trespasser, he became so when the wrench reached the airspace near the land or fell on the ground. For the persistent noise he may be held liable on the ground of nuisance.

We may now briefly give the essential facts in a few situations which have actually arisen and which call forth the application of the legal principles in question.

Illustrative Cases Arising out of Travel Through the Air

Case 1. The proprietor of the "Cackle Corner Poultry Farm" at Garrettsville, Ohio, wrote to the Postmaster General:

"I am a poultry raiser keeping about 2,500 Leghorn hens. About once in two or three weeks an airplane, sometimes it is a U. S. mail plane, flies over my place so low that the hens become so frightened that they pile up, thus injuring each other and my egg yield drops one or two hundred eggs per day, and by the time I get them back to normal along comes another low flying machine and sends the egg yield down again. I dare say a small flock would not be harmed as much as the larger flocks, but the loss to me is so great that I fear it may put me out of business and I wondered if the planes could not be requested to fly higher."⁴⁴

The Postmaster General requested the National Air Transport, Inc., which operates the United States mail planes

⁴² R. P. Shick, *Swiss Civil Code*, Sec. 667 (Boston: The Boston Book Company, 1915).

⁴³ F. L. Joannini, *Argentine Civil Code*, Sec. 2552 (Boston: The Boston Book Company, 1917).

⁴⁴ Postoffice Department Press Release, in *Domestic Air News*, January 31, 1928.

between New York and Chicago, to order its pilots to ascend a little higher when they reach Garrettsville. What would have been the rights of the farmer if the National Air Transport and the Postoffice Department had paid no attention to this request?

Case 2. Several years ago the dirigible "Shenandoah," while passing over Eastern Ohio was torn to pieces by a storm through no fault of the officers in charge, the parts falling on the lands of certain farmers. Curiosity seekers gathered from all parts of the country, trampling down the vegetation and destroying fences. Some of the farmers applied to the United States Government for damages. It developed that in certain instances the farmers had charged admission for the privilege of entering upon their land. What are the legal rights of the farmers and should this latter fact alter their status?

Case 3. The owner of the land alongside a French airfield built a board fence so high that the airplanes in their descent or ascent were unable to clear it. The proprietor of the airdrome sought a court order against the adjacent landowner on the grounds that the fence was serving no useful purpose. Should the injunction be granted?

In Case 1 the farmer would possess the right to force the planes to fly at a higher altitude, if they constitute a nuisance.⁴⁵ If the company had not complied with his request, he would have a right to relief both at law and in equity.

A recent decision by Judge John C. Michael of a District Court in Minnesota, involving an action brought by a landowner "to recover damages and to

enjoin the defendant fliers from again flying over the plaintiff's premises regardless of the altitude of such flight" promises to become the law on the subject. Judge Michael said:

"The upper air is a natural heritage common to all of the people, and its reasonable use ought not to be hampered by an ancient artificial maxim of law (*Cuius est, etc.*) such as is here invoked. To apply the rule as contended for would render lawful air navigation impossible, because if the plaintiff may prevent flights over his land, then every other landowner can do the same.

"Condemnation of airplanes is not feasible, because aircraft cannot adhere strictly to a defined course.

"Common law rules are sufficiently flexible to adapt themselves to new conditions arising out of modern progress, and it is within the legitimate province of the courts to so construe and apply them. This very rule has been modified by our Supreme Court in respect to subterranean waters. (*Erickson v. Crookston*, 100 Minn. 481 (1907)).

"The air, so far as it has any direct relation to the comfort and enjoyment of the land, is appurtenant to the land, and no less the subject of protection than the land itself; but when, as here, the air is to be considered at an altitude of two thousand feet or more, to contend that it is a part of the realty, as affecting the right of air navigation, is only a legal fiction devoid of substantial merit. Under the most technical application of the rule, air flights at such an altitude can amount to no more than instantaneous, constructive trespass. Modern progress and great public interest should not be blocked by unnecessary legal refinements.

"Failure to sustain the plaintiff's contention, relative to upper air trespasses, does not deprive him of any substantial rights, or militate against his appropriate and adequate remedies for recovery of damages and injunctive relief, in cases of actual trespass or the commission of a nuisance."⁴⁶

desirable, they may well constitute a nuisance which the legislature may abate." In a German case the plaintiff's land declined in value on account of the great noise from airplanes. He was awarded damages. See Zollman, *op. cit.*, p. 27.

⁴⁶ Quoted in Greer, *op. cit.*, in section on Municipal Law.

⁴⁵ The Supreme Court in *People v. Smith*, 196 N. Y. Supp. 241 at 243 (1922) said in effect: "When seaplanes make their base at the head of a small lake and carry passengers for hire, flying at various heights above the lake's surface and shores with a noise which at times is deafening and makes property along the lakes less

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In Case 2 the farmers have the right to damages, and the fact that they were charging admission would perhaps only serve to give the government a chance to consider these receipts as a subtraction from the actual damages incurred.⁴⁷

In Case 3 there seems to be a great doubt as far as American law is concerned. Some of our states permit a man to build a "spite fence" in ordinary circumstances even though it shuts off air and light from a neighbor's premises. In such case, the fence may be legal even though it be conceded that airplane operators have rights in the upper air. As the spite fence doctrine seems to be of American origin, the case would probably be decided differently in Europe or in states which do not permit the construction of spite fences or buildings. In France, for instance, the owner of the land alongside the airdrome was forced to tear down the fence. If it had served a useful purpose, the decision would perhaps have been otherwise.

Illustrative Cases Arising out of Communication Through the Air

In the field of wireless we may also describe several situations and discuss the pertinent principles involved.

Case 4. A Chicago doctor has spent many years in developing and installing delicate laboratory equipment used in connection with his practice. The popularization of radio telephonic broadcasting

has resulted in ether waves interfering with his instruments. Likewise, some of his electrical apparatus tends to hamper radio reception in the community. What are the respective rights of the parties? Has the doctor, who was the first in the field, a right of priority?

Case 5. Under the Radio Regulatory Act of 1912, the proprietors of radio transmitting stations were required to obtain a license from the Secretary of Commerce (and Labor). Among other things this license stipulated the term of the license and recited the wave length on which the station was to operate. The law, however, did not give the Secretary power to limit the term of the permit, but stipulated that the license was revocable only for cause. The Secretary had no discretion in the granting of the license⁴⁸ nor could he compel adherence to the use of the power and wave length specified. A station proprietor duly licensed shifted operations from the wave length recited in his license to one so close to that of a previously authorized station as seriously to interfere with its program. Did the priority of the earlier station give it a property right in that particular portion of the ether represented by its frequency?

Case 6. Congress in 1927 enacted a law requiring all radio stations to be duly licensed whenever, in the opinion of the Radio Commission (or, after one year, the Secretary of Commerce) public convenience, interest, and necessity warranted. The licenses were to be issued

⁴⁷ In 1914, after the passage of the French act, a landowner sued three airplane companies whose machines passed continually over his property. He was awarded \$300 damages. The Court stated that the air cannot by its nature be privately owned and that it is absolutely free, but it awarded damages on account of the too frequent landings of the airmen on the plaintiff's property. *New York Sun*, June 28, 1914; 2 C. J. 304. For the same or similar cases see Woodhouse, *op. cit.* p. 7.

In another French case the court said that "the owner of land has no such proprietary ownership of the air above that he is legally entitled to prevent an

aviator from flying over it." Here the altitude was apparently sufficient. The Civil Tribunal of the Seine in a later case held "that airplanes flying from 5 to 15 meters frightening domestic animals and game, attracting spectators, and thus injuring crops and generally inconveniencing the plaintiff, render the defendant liable for damages." Cited in 53 *American Law Review* 711 at 732 (September-October 1919); 24 *Juridical Review* 321 (1913); 18 *Law Notes* 62 (July, 1914). See also *Guille v. Swan*, *supra* n. 12.

⁴⁸ *Hoover v. Intercity Radio Co.*, 286 Fed. 1003 (1923).

for short terms only. The newly issued licenses were to contain provisions as to power and wave length, adherence to which was obligatory upon the licensee. A station proprietor who had been licensed under the law of 1912 finds himself deprived by government action of the wave length on which he had been operating for many years. The 1927 law failed to provide for compensation in a case of this kind. Has the station proprietor been deprived of his property without due process of law?

Case 7. Or the owner finds that the Commission refuses to grant him a renewal license, on the ground that the operation of his station is not justified by public convenience, interest, and necessity. The apparatus, therefore, becomes practically worthless. The proprietor, claiming that his license was granted under the provisions of the 1912 law, which conferred no authority upon the government to limit the term or to revoke the license without *cause*, complains that he has a property right in the ether; that no sufficient cause for the revocation of the license has been alleged; and that the action of the Commission deprives him of property without due process of law. Does he possess a justifiable case under the Fifth Amendment to the Constitution of the United States?

The relative rights of telephone, telegraph, power, and electric railways have occupied much space in the development of electrical law. Courts have generally held that "as between electric companies exercising similar franchises in the same streets or highways, priority of franchise and occupancy carries with it superiority of right to the extent that the subsequent licensee is under the duty so to construct its system as not

unnecessarily to interfere with the prior licensee in the exercise of its franchise."⁴⁹ "This does not, however, mean that priority in grant carries with it the exclusive right in the use of the street, but merely protects the first company in its occupation of the street with its poles and wires. . . . If interference and limitation of the one or the other is unavoidable, the latter must give way, and it has been held that the fact that it is under contract with the city for work of a public nature does not alter its position or give it any claim to preference."⁵⁰

The cases just referred to pertain particularly to interference of poles and wires. Most of the litigation involving conduction and induction concerns the question of the rights of telephone and telegraph companies against electric railways and power companies. The general rule here seems to be that both parties are bound to attempt to eliminate the interference, but that if this is impossible, the prior company has the stronger right. An electric railway as well as the company interfered with must attempt to eliminate the interference, but if this cannot be done by reasonable, tested means the railway company may have the superior right, regardless of priority, since the streets are intended primarily for travel.⁵¹

Though the laboratory owner in Case 4 was first in the field, to grant recourse to him would have startling and disastrous effects on our broadcasting and communication system. He would have no more claim against the radio station than against a street car company or the proprietor of a distant quarry. The duty of the broadcaster is in this respect performed where he makes use of the most practical and up-to-date devices to enable the prevention of such interference. The

⁴⁹ 20 C. J. 314-5.

⁵⁰ 9 R. C. L. 1194.

⁵¹ J. A. and H. C. Joyce, *Electric Law*, (New York: The Banks Law Publishing Company, 1907), p. 824.

burden would seem to rest upon the proprietor of the laboratory himself to install certain insulating devices which are available at a reasonable cost.⁵²

*Sturges v. Bridgman*⁵³ is the case of a confectioner who had operated several mortars for many years without interfering with any one, until one of his neighbors, a surgeon, equipped his laboratory with certain delicate apparatus. The operation of the mortars interfered with the instruments. The court held that the mortars constituted a nuisance and that the surgeon was entitled to relief.⁵⁴ This case differs from that under consideration in that the restriction of the confectioner's activities did not have such public significance as the enjoining of the broadcasting station.

In regard to the interference of the surgeon's electrical apparatus with the broadcast listeners, a decision may be made against the surgeon on the ground that he should use his apparatus so as not to interfere with the legitimate activities of others and that he could take easily available precautions to prevent such interference. This would be true

in spite of the surgeon's priority, because the radio appears to be the logical and most advantageous use of the air.

A radio station licensed under the 1912 Act seems to have obtained a right of priority when it had firmly taken possession⁵⁵ of a certain wave length. Since the ether belonged to no one, it would seem that the proprietor of such station is in the same position as he who cuts ice on a public pond,⁵⁶ or who combines the letters of the alphabet in a slogan or a book⁵⁷ or who kills wild game⁵⁸, or who appropriates for himself the waters of a non-navigable stream.⁵⁹ By taking possession of, and using, a certain wave length, he has acquired a property right which is superior to the claims of succeeding parties. Any other party attempting to operate on the same wave length so as to interfere with the efficiency of the prior party would be liable under the 1912 Act to a suit for civil damages or a petition for relief.

A recent case illustrates the situation. The WGN station of the Chicago Tribune complained to an Illinois Circuit

⁵² Cf. 18 *Case and Comment* 138 at 142 (1911).

In denying an injunction sought by a telephone company against a street railway company on account of the conduction the court said: "The substance of all the cases we have met in our examination of this question . . . is that, where a person is making a lawful use of his own property, or of a public franchise, in such manner as to occasion injury to another, the question of his liability will depend upon the fact, whether he made use of the means which in the progress of science and improvements have been shown to be the best; but he is not bound to experiment with recent inventions, not generally known, or to adopt expensive devices, when it lies in the power of the person injured to make use himself of an effective and inexpensive method of prevention. . . . Unless we are to hold that the telephone company has a monopoly of the use of the earth within the city of Nashville, for its feeble current, not only as against the defendants, but as against all forms of electrical energy which in the progress of science and invention may hereafter require its use, we do not see how this bill can be maintained." *Cumberland Telephone & Telegraph Co. v. United Electric Railway Co.*, 42 Fed. 273 (1890); see also Joyce, *op. cit.*, p. 811.

⁵³ 1879 L. R. (Ch. D.) 852.

⁵⁴ See also Zollman, *op. cit.*, p. 123.

⁵⁵ Since it may seem impossible to hold or possess a channel in the intangible ether, it would be more accurate to state that "one owns not the thing, but the right of possession and enjoyment of the thing." Tiffany, *op. cit.*, p. 5.

⁵⁶ *Ibid*, p. 1031.

⁵⁷ See 26 R. C. L. 834-5; 6 R. C. L. 1099.

⁵⁸ See R. T. Ely, *Property and Contract* (New York: Macmillan, 1914) p. 102, 112-3.

⁵⁹ In Arizona, Colorado, Idaho, New Mexico, Nevada, Utah, and Wyoming any person, whether a riparian owner or not, who first appropriated water from a stream or lake for some "beneficial and continuing use" got a first claim on the water even as against the riparian proprietors. In 10 other states this appropriation must have been made before the land bordering the stream passed out of the hands of the government. The doctrine of appropriation has in some states and by the Federal Reclamation Act been modified so that in case of a deficiency the first appropriator does not get all the water, but an apportionment among the farmers is made. Tiffany, *op. cit.* p. 1155-6; R. T. Ely and E. W. Morehouse, *Elements of Land Economics* (New York: Macmillan, 1924) p. 162-5.

Court that a nearby broadcaster, Oak Leaves Broadcasting Station, WGES, was operating on a wave length sufficiently close to that of the Tribune station to interfere seriously with its programs. Chancellor Wilson of Chicago, after discussing various analogies, held that priority in the use of a wave length, investment in property on this basis, and the education of the radio receiving public to it, established a priority of right in the particular part of the ether involved. Since WGN was prior in time it had a priority in right. "We are of the opinion, further, that under the circumstances of this case priority of time creates a superiority in right."⁶⁰ WGES was enjoined from broadcasting on its chosen wave length. This case was a new application of the old rule: "First there, first served; possession is nine-tenths of the law." This decision serves to entrench prior existing stations in their vested rights in the air. This consideration may force Congress to provide for the granting of compensation if any great change in the use of wave lengths is to be made, or if the number of our radio broadcasters is to be greatly reduced, or their locations adjusted so as to serve better all sections of the country.

In Case 5 it appears, therefore, that in the instance of a station having been

⁶⁰ Decided Nov. 17, 1926 in Circuit Court of Cook County, Ill.; see *Chicago Tribune*, Nov. 18, 1926. This case is also discussed in 13 *Virginia Law Review* 611 at p. 613 (1927) and in Davis, *op. cit.*, p. 130. Davis (p. 120-130) discusses a number of analogous cases in which the priority rule has been applied.

⁶¹ According to the Federal Court of Chicago in *U. S. v. Zenith Radio Corporation*, 12 Fed. (2d) 614 (1926) the federal licensing agency had under the 1912 law no power to limit the term of a license or to compel adherence to a certain power or wave length.

In response to an inquiry from Secretary of Commerce Hoover as to his powers under the 1912 Act, the Attorney General of the United States in the summer of 1926 arrived at a similar conclusion. From this time up to the appointment of the Radio Commission there was no effective regulation of radio broadcasting in the United States. The absence of public convenience,

established prior to the passage of the Radio Act of 1927, a property right has accrued when that station has made consistent use of a particular wave length. When Congress passed the 1927 Act, there were more than 28,000 radio stations of all kinds in the United States, including 733 of the type popularly known as "broadcasters" or program stations. This law requires all stations to be licensed not only for a definite term but for the use of prescribed wattage and wave lengths, and also requires the waiver of any possible property rights which may have been thought to vest under the license. In other words, if public convenience, interest and necessity require, the government may cancel a previously granted license which under the old law was revocable only for cause;⁶¹ it may force a station to shift its wave length and to adapt its power according to public convenience and necessity. In this process of adjustment, no provision is made for the payment of compensation. Under these circumstances it seems that stations established prior to 1927 and operating up to that time have the right to continue operation if they so desire, unless compensation is granted. Therefore, in Case 6, the proprietor has been deprived of his property without due process of law.⁶² There seems to be no question, however, that the vesting of property rights in favor of future licen-

interest and necessity would not under our constitution be considered an adequate "cause" for the revocation of a license.

⁶² Recognizing that the closed or shifted stations have some rights under the Constitution, the Radio Law Committee of the American Bar Association in its report gives eight reasons why compensation should be given. The most important of these is the fact that "These rights (to a certain channel) were obtained under the 1912 statute which does not fix a limitation in time and specifically provides that it (the license) may be revoked only for cause." (For report of the Committee see 12 *American Bar Association Journal* 848 (December, 1926); 13 *Virginia Law Review* 611 (1927) and Davis, *op. cit.* p. 66.

sees is checked by the provision in the law that no license shall be construed to give the licensee any rights beyond those stipulated in the license;⁶³ that all licensees must sign a waiver of any claim to the use of the ether or any wave length as against the regulatory power of the United States (Sec. 5-H); and that the license must state on its face that the licensee secures no rights beyond the time for which the license is granted. (Sec. 11, a.)⁶⁴ Therefore, in cases 6 and 7, the station proprietors seem to possess justifiable claims under the Fifth Amendment to the Constitution of the United States.

Station WGL which had been operating prior to the passage of the 1927 law on a frequency of 710 kilocycles (422.3 meters) was denied the use of this wave length. The owner decided to bring suit against the Radio Commission on the constitutional grounds that the law had without compensation circumscribed the use of facilities on which large sums had been expended. This suit was, however, subsequently withdrawn,⁶⁵ for the reason that the station owner did not care to hamper the activities of the newly created Commission.⁶⁶

⁶³ Section 1 also states (that this Act is intended) "to provide for the use of such channels, but not the ownership thereof . . . for limited periods of time."

⁶⁴ At the time of the passage of the 1927 law there seems to have been much doubt in the minds of the Senators and Congressmen as to vested rights in the ether. Most of them agreed that no vested rights should be acquired in the future, but there was some confusion as to the rights of the stations already licensed. The sponsors of the conference report thought that the following section would abolish the rights, if any, of previously established operators: "No station license shall be granted by the (Radio) Commission or the Secretary of Commerce until the applicant therefor shall have signed a waiver of any claim to the use of any particular frequency or wave length or of the ether as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise." (Section 5 H). The meaning of this section even to the legislators themselves was uncertain. (See *Cong. Record*, Feb. 3, 1927, p. 2870). If the courts interpret it as depriving the previously established

The problems involved in Case 5 will become of ever-increasing importance, since the Commission now assigns wave lengths; and an interference with a station operating on its legitimate wave length will not only be a cause for civil damages as under the law of 1912 but will also constitute an illegal act subject to criminal prosecution. The problems involved in Cases 6 and 7 will also be of increasing importance, not only because of the great number of stations in operation at the time of the passage of the 1927 Act, but also because of the necessity for a station owner to prove public convenience, interest, and necessity with due regard to the geographical location of stations. The recent order of the Federal Radio Commission directing the representatives of 174 stations, scattered throughout the entire country except the southern district or zone, to show cause why their licenses should not be cancelled on August 1, 1928, promises to bring into our federal courts this important question of constitutional law.⁶⁷

Conclusion

The law is an evolutionary product. It must, and does, change to meet new

stations of their priority rights under an indeterminate license, there is grave doubt as to its constitutionality. Since Congress itself did not know the meaning of its own language, the courts may give it a non-confiscatory interpretation, so as to preserve its constitutionality. Many of the stations signed this waiver only under protest.

⁶⁵ *United States Daily*, Aug. 3, 1927.

⁶⁶ To the reader who may wonder why such restriction is not justified under the theory of the police power, it may be stated that it is exceedingly difficult to connect it with the public health, safety, or morals.

⁶⁷ Other important questions may also be involved. For instance, if the license of the only socialist station, WEVD, is revoked, the issue of free speech will undoubtedly be raised. This station has filed a brief demanding that it be "treated on a parity with others who are richer and more influential with the government." "We ask no special privilege," the brief con-

(Continued on page 278)

conditions. Several centuries ago the problem of property in the air was merely academic; today it is practical. The solution of this question will come only after a delicate balancing of the rights of the individual and of society. The individual must be protected, but his "bundle of rights" should not neces-

(Footnote 67 continued from page 271)

tinues. "Give us the power, the time and as advantageous wave length as have been bestowed on these great and mighty money making interests." Associated Press dispatch in the *Minneapolis Journal*, July 9, 1928.

sarily be so enlarged as to jeopardize the development of new industries. On the other hand, while in our advancing culture the common rights of society are likely to be enlarged, due heed must be given to the individual who may find his property and business rights irreparably damaged. In this balancing process, the particular legal rule governing use of the airspace should be varied according to the peculiarities of different uses, as in the cases of transportation and communication.

AREA REQUIREMENTS OF CITIES IN THE REGION OF CHICAGO

By ORMAN S. FINK and COLEMAN WOODBURY

FORECASTS of urban population have been of more than passing interest for some years to many business and professional groups. Chambers of commerce, public utility companies, large manufacturers, and city planning bodies have sought estimates of population growth and have found or made them with widely differing degrees of scientific spirit and skill. But although every student of cities would admit that population increase is only one side of urban growth, and perhaps not the most significant one, forecasts of these other kinds of growth, for some reason or other, have been slow in developing. This study was planned to give some means of estimating how much land a city in the region of Chicago will need at a future date to accommodate an expected population. The hope is also held that the description of the method used will encourage similar studies with the same or an improved technique in other regions or by independent cities.

The practical need for such a study, in addition to its scientific interest, is too plain to require lengthy comment. Until the last few years area growth in the region of Chicago, as in most American cities, has been entirely in the hands of private subdividers. The subdivider, who realized the certain effects of over-subdivision and tried to regulate his policy accordingly, simply has lost possible customers. The need for some co-ordination of street layout, the maintenance of certain standards of open spaces, width of streets, and block sizes led to county control of subdivisions outside of city limits which first became

effective under the guidance of the Chicago Regional Planning Association beginning in 1925. Municipal subdivision ordinances with the same purposes have been passed to control land development within city limits. But although some officials and some real estate men have realized that subdivision has been proceeding, in the years 1924-1927 at least, at a ridiculously rapid rate, their powers of checking it have been practically non-existent. In other words, subdivision development and subdivision control have lacked a quantitative basis. As a result, thousands of lots have been placed on sale which are almost certain losses to their original buyers; hundreds of acres of land have been taken out of farm use which were of considerable value for truck farming; the financial backers of some subdividers have been experiencing hard times and many are seeking some new stimulus for the local subdivision market; and many communities are confronted with the cost of supplying paving, transportation, police and fire protection to an absurdly large and thinly populated area.

At first glance, determining roughly the area requirements of cities from population estimates may seem a fairly simple procedure. If a city expects a 50% increase in population by 1940, why does it not plan for an area increase of 50%? The answer, of course, is that cities do not grow in such an arithmetical manner. Vacant lots afford housing room without area additions; apartments may take care of an increasingly large percentage of the population; the

sizes of lots in the new subdivisions may be markedly different from those in the older parts of the city. The arbitrary assumption of proportionate area increase must be abandoned and attention turned to a measurement of the existing and previous relation of area to population as the first step in estimating future requirements.

The Technique of the Study

The sources of material were three: insurance maps, the maps kept by the local building inspectors, and the maps made by the United States Geological Survey. The last mentioned were found to be the most nearly satisfactory. They were available for 26 cities at two periods, 1897-1899 and 1925-1926, and the total number available for the latter period was 40. In addition, 21 cities were on maps prepared during the years 1920-1924. The number of cities included and their variation in character made a sample superior to that possible from either of the other sources.

Chart I is a reproduction of the map of the village of Hinsdale in 1925, a typical survey map. The buildings are shown by the heavy black dots or bars. Even a cursory examination of such a map raises the most perplexing and the most important question of the study: What area shall be used in determining the density factor (persons per acre) for the town? Two extremes may be suggested. First, the area taken may be limited by the political boundaries of the municipality. The population measurements are for this area and with two figures for the same area, one in acres and the other in number of persons, a ratio of population to area could be easily found. But the crudeness of such a method is obvious. Political boundaries may be expanded for many reasons and the area set off by them in

many cases would include large tracts not even subdivided. Some towns of the region have taken large areas within their political limits for the purpose of controlling their subdivision at a later time. Much of the area included would not be in any sense *used* for urban purposes. Other towns expand their boundaries slowly in order to postpone as long as possible the costs of maintaining a large area. Plainly, since the ratio or density factor sought should not be affected by such influences as these, the use of political area as a standard of measurement is unwarranted.

The other extreme would be to use an area equal to the total area of the lots built upon plus the street and park area required to supply them with access and play space. In other words, a line might be drawn somewhere within the political boundaries so that the number of vacant lots within the area marked off would just equal the number of improved lots outside of it. Using this area, the density ratio would be that of a solidly built up city, although of course the particular ratio would vary with the population and the type of physical development, which is affected chiefly by lot sizes and street layout. The area measured would be only that actually built up by the population.

While this method would give results technically more accurate and refined than the former, it neglects certain aspects of city growth that should not be overlooked in any forecasting of area requirements. Vacant lots in limited number are highly desirable, especially in young and growing cities. They provide room for expanding both commercial and residential uses without undue shifting of use districts and the economic losses accompanying such shifting. Moreover, they insure some measure of competitive control of land rent and

values. In other words, some vacant lots are useful as reserves. A method which eliminated all vacant lots from the area figure would not serve the purpose of this study and the application of such a ratio would be of small practical value.

Between these two extremes of measurement a more or less arbitrary determination of area might be made. For example, all city blocks with $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$, or any other fraction of their lots improved might be included within the utilized area of the city.¹ The obvious drawback to such an arbitrary settling of the problem is the difficulty of justifying the chosen standard of utilized area against other possible standards. If the improvement of $\frac{1}{2}$ of the lots is declared the minimum for utilized area, what can be said against $\frac{1}{2}$ or $\frac{1}{4}$? Of course, such a standard might have a practical application if clearly recognized as being set by individual or group fiat for a particular purpose, but a more objective and probably a more satisfactory definition for utilized area can be made.

This more objective standard is derived from the policy of the public utilities of the region respecting extensions of service to consumers. Investigation revealed that the minimum requirement of the utilities for extending gas, electric, and telephone mains or lines at the company's expense, reduced to terms of percentage of block area built upon, is six buildings per the customary city block of 660 feet by 330 feet or a percentage of occupancy of approximately

25%. Within this area containing six or more buildings per block, hereafter referred to as *gross utilized area*, all lots will be supplied with the utility extensions named without special cost to the consumer. Such lots are, in the great majority of cases, urban lots in fact as well as name. This standard is based upon the obvious fact that a city lot is not merely a very small fraction of a farm, properly surveyed and staked off. This is too often ignored by subdividers and purchasers of land. In order to be of urban use a lot must be readily accessible by the ordinary means of transportation to other lots and to other communities, and it must be supplied with those services and utilities required by modern standards of urban living. As an illustration, Chart I is presented showing the gross utilized area of Hinsdale outlined by the solid line.

In applying this standard of area some difficulties were found which require brief explanation. Not all blocks are of regular shape or of the Chicago standard, 660 by 330 feet. In such cases the fairly safe method was followed of computing their area, comparing it with the 5-acre area of the standard block, and determining the number of buildings it should contain to meet the requirement of utilization. If the block was abnormally large, evidently requiring further subdivision, but if one portion of it was improved to the required density, the area of that portion only was included in the utilized area.

The gross utilized area so determined for each city included land used not only for residences and streets but for business uses, industrial plants, parks and playgrounds. This raised another troublesome question. A park or playground might be indicated as a vacant block or with only one or two buildings. In cases where a block so shown was

¹ Mr. Robert Whitten in his excellent study published as "A Research into the Economics of Land Subdivision," 1927, considered "tracts in which 50% or more of the lots were built upon" as built-up area. Some question might be raised not only as to 50% as the definition of built-up area but also to using "tracts" or subdivisions as units. His results showed a tendency toward less density in 10 eastern cities. This monograph is deserving of careful study by everyone concerned with this problem.

entirely surrounded by highly utilized area it was included within the utilized area. Checking the maps of recent date with the known existence of playgrounds and parks bore out the soundness of this method. For the earlier maps such a check could not be made but the possible percentage of error is very small. A park might be located just on the boundary of the utilized area and by this method would not be counted but here, again, the percentage of error

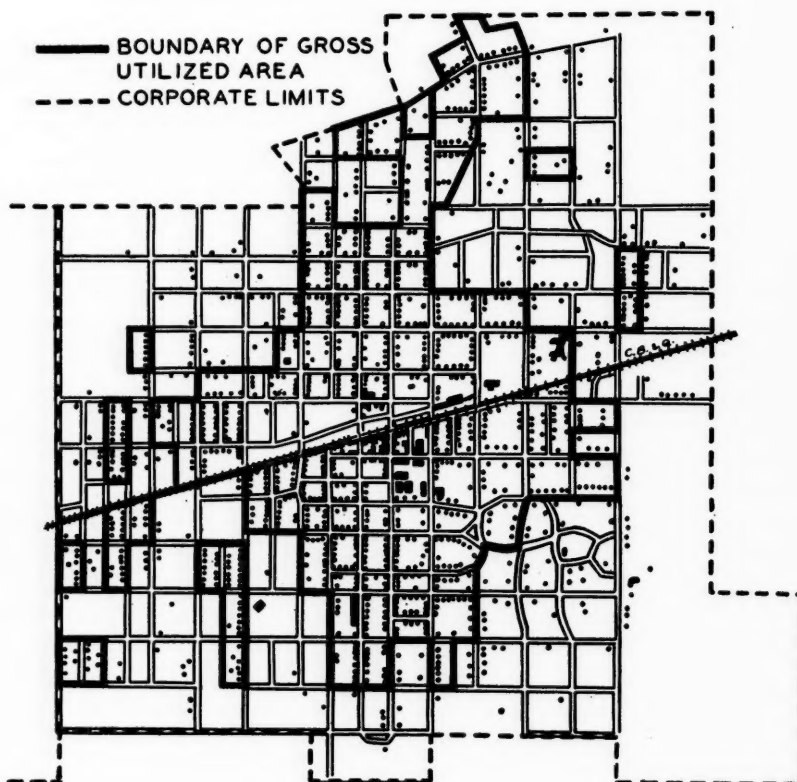
would be small and much of the park area undoubtedly was planned for the use of people who will live at some future time outside of the present utilized area.

The maps show the existence of large industrial plants by the shape and size of marking and one large plant would be sufficient to include a block as utilized.

Such a method of marking off utilized area makes necessary a correction of population figures by that portion of the population of any city living outside of

CHART I.

VILLAGE OF HINSDALE, 1925



the utilized area. This correction was made by counting the number of buildings within municipal limits but outside of the utilized area, assuming that each building houses one family, and subtracting the calculated number of persons from the population figure for the town or city. The population figures for 1897-1899 were interpolated between the 1890 and 1900 census figures and those for 1925-1926, from the population estimates of the Chicago Regional Planning Association. The assumption of one family per building outside of the utilized area seems justified by the type of development common in the towns included in the study. By this method a corrected or net population figure is obtained for the gross utilized area of each city at the time of the map survey. The density factors in persons per acre resulting from these figures are an index to the type of development taking place in the region and, therefore, to the probable area requirements of the future. The method described may be recapitulated in the following steps:

- (1) Marking off as gross utilized area all city blocks with an intensity of improvement of six or more buildings per standard block;
- (2) Calculating the size of such area in acres from the scale of the map;
- (3) Estimating the total population of the municipality for the date of the map by interpolation of census figures or reliable estimates;
- (4) Subtracting from the total population the estimated number of persons living outside of the utilized area to find the net or corrected population;
- (5) Dividing results of (4) by result of (2) to find the density factor for the municipality, in persons per acre of gross utilized area.

Area Requirements in two Periods Within the Last 25 Years

This method was applied first to the 26 towns and cities for each of which two maps were available, the first in the period 1897-1899 and the second in 1925 or 1926. Observers of city development during this quarter century have disagreed as to the trends in land utilization. Some have pointed to the increased number of apartment houses, the expansion of the zone of influence of the central city with the normal and, in many cases, inflated rise in land values, and have claimed that as the outlying cities of a region have become more mature the population has become more dense. Others have suggested that the increase in transportation facilities, both by automobile and by rapid transit, the growth of city planning and zoning, the extension of adequate public utility service, and the increase in wealth of the region as a whole, have spread out the urban population and that the density factor must have decreased.

The test of these arguments gave an interesting, if rather inconclusive, result. The 26 cities in the early period had a total population of 70,658 of which 60,831, or 86.1%, were living within the utilized area. In 1925-1926 the total population of the same cities was 271,845 with 252,235, or 92.7%, inside the utilized area. This suggests that the fringes of city areas are today rather more compactly built than formerly and that the "sprawling" of the young towns is giving way to a slightly more contiguous growth.

But a comparison of the density factors of the two periods shows the very limited extent of this movement. The arithmetic mean density factor for the 26 cities at the early period was 11.5 persons per acre of utilized area; in the

later period the corresponding average was 12.1 persons per acre. The range in the early ratios was from 3.4 to 18.3 and at the later period from 4.3 to 20.7. In addition, Table I shows the change by

TABLE I. DENSITY FACTORS OF 26 MUNICIPALITIES IN THE REGION OF CHICAGO IN THE PERIODS 1897-1899 AND 1925-1926

Municipality	Density Factor in Persons per Acre		Change in Density
	1897-1899	1925-1926	
Increasing Density			
Forest Park (Harlam) ..	11.3	20.7	+9.4
Oak Park.....	12.3	20.5	+8.2
Deerfield.....	4.4	9.8	+5.4
Park Ridge.....	3.4	8.7	+5.3
Orland Park.....	4.3	8.8	+4.5
Des Plaines.....	5.7	9.3	+3.6
Homewood.....	5.9	9.3	+3.4
Brookfield (Grossdale) ..	4.2	7.3	+3.1
La Grange.....	10.0	13.0	+3.0
River Forest.....	6.3	9.2	+2.9
Melrose Park.....	14.7	17.4	+2.7
Thornton.....	5.0	7.6	+2.6
Niles Center.....	5.3	6.6	+1.3
Wilmette.....	7.7	8.7	+1.0
Western Springs.....	5.2	6.0	+0.8
Evanston.....	14.7	15.1	+0.4
Decreasing Density			
Hinsdale.....	18.1	6.1	-12.0
Arlington Heights.....	17.2	7.7	-9.5
Highland Park.....	12.6	6.7	-5.9
Highwood.....	18.3	12.4	-5.9
Harvey.....	15.4	10.5	-4.9
Elmhurst.....	10.9	7.4	-3.5
Kenilworth.....	10.0	6.5	-3.5
Maywood.....	16.4	14.5	-1.9
Winnetka.....	9.9	8.3	-1.6
Lansing.....	4.9	4.3	-0.6

cities; 10 cities decreased in density while 16 increased. It might be supposed that rapidity of growth would make for increased density but taking the rate of growth during the period between the two surveys for the two groups of cities fails to reveal such a relationship in this case. The 10 towns with decreasing densities increased in population 279.5% during the period while the 16 with increasing densities had a population increase of 286.9%, hardly a significant difference in rate.

The evidence of this sample points to but one answer as to the change in density of population. In the region of Chicago the density of population, measured in persons per acre of utilized area, of outlying towns and cities of less than 60,000 has shown no marked general change or trend during the last 25 or 30

years. A slight indication is found of a more compact improvement of land but no generalization is warranted. During their last quarter century of growth the forces making for rapid expansion of utilized area and those which might be expected to increase the density of population practically have offset or neutralized each other in the cities studied. This statement does not mean that no changes in density of population have taken place during the interval between periods of measurement, nor does it imply that a change may not be taking place at present; it merely shows that changes of note, if they have occurred, are not shown in the resulting densities at the two periods. For the purpose of forecasting area requirements the conclusion from this study of the available material for 26 municipalities in this region is that no decided trend in density is revealed which might be projected into the future.

Passing notice should be given to the figures for 21 additional cities mapped during the years 1920-1924. Of their total population of 163,726 persons, 96.3% or 157,696 lived within utilized areas. Their arithmetic average was 11.7 persons per acre. This material could not be used as intermediate data in the comparison of the 1897-1899 and 1925-1926 results because it is for entirely different communities; its addition to the sample of 40 cities for the later period might be questioned because of the activity in subdividing and building between 1920 and 1926. It does, however, give supporting evidence for believing that recent building and subdividing are making no radical changes in the area requirements of cities in this region.

Conditions Affecting Density Factors

The remainder of the study is an analysis of the density factors of the

1925-1926 survey. Fourteen more towns with 1925-1926 maps, which were excluded from the time comparison above because they were not surveyed at the early period, were added for this analysis. They brought the total number of municipalities in the sample to 40 which was the entire number covered by the 1925-1926 geological survey. The total number of incorporated places in the region is 278 so that the 40 cities made up a sample of slightly over 14%. The aggregate total population of the 40 cities was 341,481, or 23.7% of the population of the region outside of Chicago,² of which 313,758, or 91.9%, lived within the utilized area. Table II gives the data

²From "Forecast of Population in the Region of Chicago," Chicago Regional Planning Association, January 1928, p. 2.

TABLE II. DENSITY FACTORS IN 40 MUNICIPALITIES IN THE REGION OF CHICAGO IN 1925-1926

Municipality	Density Factor (in persons per acre)	Gross Number of Acres Utilized	Corrected Population
Forest Park.....	20.7	655	13,603
Oak Park.....	20.5	2,795	57,315
Berwyn.....	18.5	1,772	32,920
Melrose Park.....	17.4	534	9,322
Evanston.....	15.1	3,308	50,195
Maywood.....	14.5	1,239	17,869
Glenwood.....	13.5	66	892
La Grange.....	13.0	690	8,994
Highwood.....	12.4	178	2,202
Phoenix.....	11.6	205	2,380
Elmwood Park.....	10.8	452	4,878
Harvey.....	10.5	1,270	13,416
Bellwood.....	10.3	190	1,965
Deerfield.....	9.8	185	1,816
Morton Grove.....	9.8	172	1,682
Mount Prospect.....	9.7	65	629
Des Plaines.....	9.3	732	6,792
Homewood.....	9.3	292	2,725
River Forest.....	9.2	697	6,419
Hazel Crest.....	9.0	98	885
Orland Park.....	8.8	46	404
Park Ridge.....	8.7	803	7,010
Wilmette.....	8.7	1,302	11,405
Winnetka.....	8.3	1,072	8,897
Arlington Heights.....	7.7	303	2,355
Thornton.....	7.6	110	839
Elmhurst.....	7.4	1,251	9,227
Brookfield.....	7.3	625	4,569
Lyons.....	7.1	368	2,617
Highland Park.....	6.7	1,042	7,006
Niles Center.....	6.6	174	1,145
Kenilworth.....	6.5	254	1,657
Glencoe.....	6.3	666	3,820
Riverside.....	6.3	644	4,076
Hinsdale.....	6.1	675	4,141
Western Springs.....	6.0	273	1,634
Glenview.....	5.6	165	932
Villa Park.....	4.7	640	3,025
Lansing.....	4.3	272	1,178
Totals.....	11.9	26,363	313,758

by cities. The arithmetic average density factor is 11.9 persons per acre of utilized area. The data for these 40 cities and towns were used in analyzing what forces or conditions were related to differences in density factors.

The conditions making for high or low densities can be discovered by classifying the communities according to certain characteristics and working out averages for each class. Conditions affecting densities are not only revealed but some evidence is given as to their relative strength. The classifications are made

TABLE III. AVERAGE DENSITIES OF CLASSES OF MUNICIPALITIES IN THE CHICAGO REGION IN 1925-1926

Class	Number of Municipal- ities	Arithmetic Mean Den- sity Factor (in persons per acre)
20-30 minutes from Chicago.....	11	14.8
30-40 minutes from Chicago.....	15	8.9
40 minutes and over from Chicago.....	14	8.4
Chicago residential.....	9	16.3
Industrial.....	4	10.0*
Outlying residential.....	27	7.8
Population 25,000 and over.....	3	17.8†
Population 10,000-25,000.....	4	12.6
Population 2,500-10,000.....	16	8.4
Population under 2,500.....	17	8.1

* 13 industrial towns, including 9 additional from 1920-24 maps, give 12.5.
† 6 towns over 25,000, including 3 additional from 1920-24 maps, give 15.9.

on the hypotheses that certain conditions influence the density factor; the averages show the truth or error in the hypotheses and give definite figures representative of the classes in the Chicago region. Unusual care in applying averages to individual cities must be taken and no claim whatsoever is made for their applicability to other metropolitan areas.

The averages which show factors influencing suburban densities are given in Table III. The first classification tried was that of accessibility of the suburbs to the central business district of Chicago. Previous investigations showed this to be a strong force on the economic organ-

ization of suburban towns. The chief difficulty is to find a reliable measure of accessibility. When travel is possible by train, trolley, motor coach, rapid transit, and private motor car an inclusive measure is exceedingly difficult, if not impossible, to find. The measure used in this study was based on distance and train service, both steam and electric. Train service was judged by the time of express travel to the Chicago terminal and the number of trains daily. The classifications of distance and number of trains did not give significant averages. Time from the central terminals did show a definite relation; the greater the time the less the density. In other words, the most readily accessible towns, judged by time of travel, have the most intensive use of land for residential purposes.

Type of community was the second condition tested. The first broad classification was between towns properly called industrial and those primarily residential. According to a survey of the Chicago Regional Planning Association, the average of industrially employed to total population in the region is slightly under 15%. Hence, all cities in which the number of industrially employed was over 15% of the total population were classed as industrial. The remaining cities, the residential communities, varied widely in character and a further classification seemed justified. Cities which form part of a contiguous growth from Chicago and have made no successful attempt, either in their zoning ordinances or otherwise, to change their type of development from that of the outlying sections of Chicago proper are held to be economically mere extensions of Chicago and are called "Chicago residential." Other residential communities were grouped as "outlying residential."

The averages in Table III show that the industrial towns rank between the residential classes in density. Unfortunately, of the 40 cities only 4 were industrial. However, from the group of 21 surveyed from 1920-1924 nine other industrial cities were included. The average for the 13 industrial cities, given in the footnote of the table, is higher and probably is the more dependable figure.

The size classification shows the expected averages. The group of largest cities, if augmented by 3 cities of the 21 with 1920-1924 surveys, has an average of 15.9 persons per acre instead of 17.8. It should be noted that the largest town in the sample had a population of 57,429 in 1925. As the future cities grow from this class, that is, as they become more nearly subcenters of industry and trade, reaching 100,000 population and over, the density figures will probably increase so that application of the 15.9 factor must be made with caution.

The averages, of course, are affected by the limits of the particular classifications set up. For example, if the population classification had been cities under 5,000, cities 5,000-15,000, cities 15,000-30,000 and cities over 30,000, the resulting averages, quite obviously, would differ from those given. The data are continuous, in the statistical sense of the term, representing points on a line from the lower to the higher densities. The averages are merely summarizations of the data and should not be given additional significance. In applying these figures to future populations, these facts must be kept in mind. In the case of two cities similar in every way except size of population, i. e., one with an estimated population of 10,500 in 1950 and the other with 23,000, the mechanical application of the 12.6 factor to each would be unsound. After considering the influence of type and time distance, a

larger factor would be used for the latter city because of the continuous nature of the data. The averages given show the effects of certain economic factors and they are a guide in determining the proper density factor to be used for each city or village.

The Application to Future Population

In order to find approximate area requirements the two primary assumptions underlying any application of the density factor to future populations should be stated as clearly as possible. The first is that future city building in the region will continue on lines not radically different in land requirements from those of the past. Any change in street area, park or playground space provided should be added to the areas determined from the factor given. Nothing in this study is meant to suggest that the low amount of play space in most cities in the region should not be raised or that other changes should not be introduced as, for example, increasing lot or block sizes. But with subdivision carried on as it is and has been in this region the study should give a fair measure of area needs which can be altered as necessary to meet the particular and, it is hoped, the changing conditions of any city.

The second assumption is that to maintain the same density factor there must be freedom for expansion. Some cities have met and others soon will meet barriers to expansion on one or more sides, either in the shape of physiographic features or the limits of neighboring towns. As a city's freedom of expansion becomes more and more impaired by either or both of these conditions the application of the density factors will give a less true estimate of area needs.

This condition of restricted growth is not general in the region as yet. Esti-

mates were made of the 1950 area requirements of the 40 cities used as the sample and, for the sake of comparison, a separate measure was taken of the amount of land within city limits apparently subdivided. If the existence of a minor street system was shown on the map, the land was counted as subdivided. With this rough measure of subdivided land it was found that the 40 cities and towns required an area of 58,230 acres to care for their estimated 1950 population and had, in 1925 and 1926, 43,368 acres subdivided. In other words, these municipalities had land subdivided *within corporate limits* in 1926 equal to 74% of the requirements of their estimated 1950 populations. These facts show the room for expansion for the majority of cities in the region and give as well some light on the waste in present subdivision methods.

Summary

With these two assumptions in mind, at least four outstanding and usable conclusions have resulted from the study.

1. During the 25 years just past the area requirements per unit of population of the 26 suburban towns in the region of Chicago have changed very little, their population densities remaining close to 12 persons per acre of gross utilized area.

2. Conditions which appear to affect area requirements of a municipality are (a) *time-distance from Chicago by rail*, the shorter the time the greater the density factor and, therefore, the less the area requirement; (b) *the type of community*, i.e., "outlying residential" with low density and large area requirements; "Chicago residential" with high density and small area requirements; or "industrial" with densities and area requirements between the other two classes; and (c) *population size*, the

larger cities having greater densities and proportionately smaller area requirements. The averages given for the different classes show these influences but are only points on a continuous line from the lower to the higher densities.

3. By applying to the expected 1950 population of any municipality the proper density ratio, determined by its time-distance, type and size, an area

in acres is found which approximates the area which will be utilized in 1950.

4. Knowing *how much* land will be occupied in 1950, or at any other date, it becomes the problem of the city and county officials and the subdividers to *determine the location* of the land to be developed and to *decide how far in advance* of actual need this land should be platted and made ready for use.

FARM LAND REQUIREMENTS FOR AGRICULTURAL PRODUCTS IN FOREIGN TRADE

By JACOB PERLMAN

ONE of the principal causes of the depression in the farm industry since 1920 has been the demoralization of our foreign markets for agricultural products. In view of this fact, it has been suggested as part of the program to stabilize agriculture that we do away with foreign exports altogether and utilize the land thrown out of cultivation in consequence of this change for the purpose of raising some of the products now imported. The object of this article is to examine the practicability of such a proposal, in so far as this is shown by possible computations of the amount of farm land liberated through the elimination of exports and transferred to the production of imports.

Method of Investigation

Table I presents a list of the various farm and forest products, in terms of single commodities and groups, showing the value of their exports from and imports into the United States for the fiscal years 1924 and 1925. It serves to point out the relative importance of the different commodities in foreign trade.

It would be a very difficult task to determine the amount of land necessary to produce all the exports and imports. In the first place, there are too many products and most of them are not important either in volume or value in foreign trade. In the second place, even if we limited ourselves only to those of importance, it is almost impossible on account of lack of data to convert all of them into land acreage. This is especially true of such commodities as ani-

mals and animal products and fruits. In order to compute the acreage necessary to produce animals and animal products, the latter must be changed into those commodities used as animal feed, a process involving the use of numerous ratios which are difficult to determine. The absence of acreage reports for the production of fruits makes impossible the computation of data for these products. Consequently, this investigation was limited to certain of the leading crops.

In computing the acreage necessary to produce the exports and imports of the principal crops, net exports and net imports are obviously the important items from the standpoint of self-sufficient agriculture. The procedure used was as follows: First, the net exports were determined by subtracting the imports from the domestic exports, while the net imports were obtained by deducting the domestic exports from the imports. In each case the figures cover fiscal years beginning July 1, 1924 and 1925.¹ Second, the quantities of net exports and net imports were *divided by the average yield per acre*,² thus giving the acreage necessary to produce the amount of the product in question. The latter was then computed as a percentage of the total acreage harvested.³ This was done by single commodities and groups for each year from 1920 to 1925, inclu-

¹ The figures used here were taken from the *Agricultural Yearbook*, 1926, and are based on the *Monthly Summaries of Foreign Commerce of the United States*, 1921-1926.

² Data were taken from *Agricultural Yearbook*, 1926, and are based on crop reports.

³ See footnote 2.

sive, with averages for the entire period. It should be noted that the figures are only rough estimates, but they are sufficiently reliable to bring out the general truth.

Farm Land and Agricultural Net Exports

The principal net exports, according to Table I, are meat and meat products, raw cotton, fruits, grains and grain

products, and unmanufactured tobacco. Because of the lack of acreage data on meat and meat products and fruits, as already explained, the calculations were limited to the five leading cereals (wheat, corn, oats, barley and rye), rice, raw cotton, and unmanufactured tobacco.

A large part of the five leading cereals produced in this country, especially of wheat, is sold abroad. As shown in Table

TABLE I. VALUE OF FARM AND FOREST PRODUCTS EXPORTED FROM AND IMPORTED INTO THE UNITED STATES, 1924-1925.*
(In Thousands of Dollars)

COMMODITY OR GROUP	YEAR BEGINNING JULY 1			
	Exports (domestic merchandise)		Imports	
	1924	1925 (preliminary)	1924	1925 (preliminary)
Total farm and forest products.....	\$2,436,568	\$2,054,458	\$2,284,042	\$2,766,980
Total farm products.....	\$2,280,381	\$1,891,717	\$1,818,578	\$1,918,461
Total animals and animal products.....	\$ 339,080	\$ 314,804	\$ 672,939	\$ 742,470
Animals, live.....	7,547	6,974	9,885	12,189
Dairy products.....	25,633	20,766	30,531	31,456
Eggs and egg products.....	7,337	8,236	6,846	9,369
Hides and skins, raw (except fur).....	11,744	10,629	92,678	94,287
Meat and meat products.....	273,207	254,047	7,159	11,411
Silk, unmanufactured.....			361,944	412,914
Wool and mohair, unmanufactured.....	133	118	124,164	125,494
Animal products, miscellaneous.....	13,479	14,034	39,732	45,350
Total vegetable products.....	\$1,941,301	\$1,576,913	\$1,145,639	\$1,175,991
Chocolate and cocoa.....	607	573	35,720	42,727
Coffee.....	8,285	9,147	267,154	314,125
Cotton, unmanufactured.....	1,060,980	917,720	50,640	50,210
Fruits.....	85,313	105,113	48,383	55,230
Grains and grain products.....	536,427	264,202	25,198	35,423
Nuts.....	1,100	1,289	35,134	31,408
Oil seeds and oil-seed products.....	47,736	41,072	131,800	148,706
Seeds, except oil seeds.....	3,602	3,419	10,290	13,196
Spices.....	236	204	18,698	17,278
Sugar, molasses and syrups.....	23,616	22,797	293,885	232,206
Tea.....			28,564	30,874
Tobacco, unmanufactured.....	131,535	167,251	78,657	60,137
Vegetables.....	17,810	18,987	33,676	39,569
Vegetable products, miscellaneous.....	24,054	25,139	87,840	104,902
Total forest products.....	\$ 156,187	\$ 162,741	\$ 465,464	\$ 848,519
Dyeing and tanning materials.....	1,937	1,782	7,360	8,150
Gums, resins and balsams.....	28,511	33,485	29,465	34,170
Rubber and similar gums.....			238,041	690,947
Wood.....	119,676	120,923	103,393	108,067
Forest products, miscellaneous.....	6,063	6,551	87,205	88,185

* *Agricultural Yearbook*, 1926, p. 1174. Based on data taken from *Monthly Summary of Foreign Commerce of the United States*, June, 1925 and June, 1926. (Exclusive of shipments to and from possessions.)

II, the average annual acreage from 1920 to 1925 devoted to the production of the net exports of the five leading cereals was 21,433,000, or 10% of the average total

TABLE II. ACREAGE DEVOTED TO PRODUCTION OF NET EXPORTS OF FIVE LEADING CEREALS, 1920-1925*

A	B	C	D
Year or Period and Product	Total Acreage Harvested (Thousands of Acres)	Acreage Devoted to Production of Net Exports	
		Total (Thousands of Acres)	Per cent. (C ÷ B)
Averages, 1920-1925—			
All products.....	216,209	21,433	9.9
Wheat.....	58,600	15,133	25.8
Corn.....	102,472	2,231	2.2
Oats.....	42,790	591	1.4
Barley.....	7,530	998	13.3
Rye.....	4,817	2,480	51.5
1920—			
All products.....	217,342	29,749	13.7
Wheat.....	61,643	22,914	37.5
Corn.....	101,699	2,069	2.0
Oats.....	42,491	159	.4
Barley.....	7,600	1,152	15.2
Rye.....	4,409	3,455	78.4
1921—			
All products.....	224,873	31,172	13.9
Wheat.....	63,696	20,718	32.5
Corn.....	103,740	6,060	5.8
Oats.....	45,495	823	1.8
Barley.....	7,414	1,369	18.5
Rye.....	4,528	2,202	48.6
1922—			
All products.....	219,942	23,234	10.6
Wheat.....	62,317	14,739	23.7
Corn.....	102,846	3,408	3.3
Oats.....	40,790	843	2.1
Barley.....	7,317	911	12.5
Rye.....	6,672	3,333	50.0
1923—			
All products.....	217,970	12,967	5.9
Wheat.....	59,659	9,836	16.5
Corn.....	104,324	782	.7
Oats.....	40,981	143	.3
Barley.....	7,835	575	7.3
Rye.....	5,171	1,631	31.5

TABLE II. Continued. ACREAGE DEVOTED TO PRODUCTION OF NET EXPORTS OF FIVE LEADING CEREALS, 1920-1925*

A	B	C	D
1924—			
All products.....	206,583	20,310	9.8
Wheat.....	52,535	15,430	29.4
Corn.....	100,863	226	.2
Oats.....	42,110	385	.9
Barley.....	6,925	1,089	15.7
Rye.....	4,150	3,180	76.6
1925—			
All products.....	210,548	11,162	5.3
Wheat.....	52,255	7,161	13.7
Corn.....	101,359	838	.8
Oats.....	44,872	1,190	2.7
Barley.....	8,088	892	11.0
Rye.....	3,974	1,081	27.2

* Based on data in *Agricultural Yearbook*, 1926, pp. 803, 825, 834, 848, 860. For procedure used in computations see text.

acreage per year harvested during that period. In 1925 the acreage devoted to the net exports of the same commodities was 11,162,000, or 5% of the total acreage harvested in that year. In the case of wheat, according to the same table, the average annual acreage for 1920-1925 was 15,133,000 and the acreage in 1925 amounted to 7,161,000, representing 26% and 14%, respectively, of the total acreage harvested.

Similarly, large quantities of rice, raw cotton, and unmanufactured tobacco are sold to foreign countries, the net exports of cotton rivalling only those of wheat in quantity. This is brought out in Tables III, IV and V. For cotton, according to Table IV, the average annual acreage for 1920-1925 used in producing net exports amounted to 20,057,000, or about 54% of the average total acreage harvested per year during that period. In 1925 the acreage used for the net exports of cotton was 22,217,000, or 48% of the total acreage harvested in that year.

In Table VI is given the acreage devoted to the net exports of all of the above crops. The average acreage per

TABLE III. ACREAGE DEVOTED TO PRODUCTION OF NET EXPORTS OF RICE, 1920-1925*

A Year or Period	B Total Acreage (Thousands of Acres)	C Acreage Devoted to Production of Net Exports		D Per cent. (C ÷ B)
		Total (Thousands of Acres)		
Average, 1920-1925.....	991	459		46.3
1920.....	1,336	543		40.6
1921.....	921	812		88.2
1922.....	1,055	521		49.4
1923.....	895	436		48.7
1924.....	850	283		33.3
1925.....	889	159		17.9

* Based on data in *Agricultural Yearbook*, 1926, p. 881. For procedure used in computations see text.

year during 1920-1925 utilized in the production of the net exports of these commodities was 42,507,000, or 17% of the average total annual acreage harvested in that period. In 1925 the acreage of the net exports for the same products amounted to 34,135,000, or 13% of the total acreage harvested in that year. In other words, if we should abolish these net exports, between 34,000,000 and

TABLE IV. ACREAGE DEVOTED TO PRODUCTION OF NET EXPORTS OF COTTON, 1920-1925*

A Year or Period	B Total Acreage Picked (Thousands of Acres)	C Acreage Devoted to Production of Net Exports		D Per cent. (C ÷ B)
		Total (Thousands of Acres)		
Average, 1920-1925.	37,327	20,057		53.7
1920.....	35,878	14,218		39.6
1921.....	30,509	23,870		78.2
1922.....	33,036	15,950		48.3
1923.....	37,123	20,050		54.0
1924.....	41,360	24,035		58.1
1925.....	46,053	22,217		48.2

* Based on data in *Agricultural Yearbook*, 1926, p. 962. For procedure used in computations see text.

43,000,000 acres approximately would have to be thrown out of cultivation.

Farm Land and Agricultural Net Imports

Before considering how much of the above "export acreage" might be shifted to the production of imported articles, certain limitations should be noted.

TABLE V. ACREAGE DEVOTED TO PRODUCTION OF NET EXPORTS OF UNMANUFACTURED TOBACCO, 1920-1925*

A Year or Period	B Total Acreage (Thousands of Acres)	C Acreage Devoted to Production of Net Exports		D Per cent. (C ÷ B)
		Total (Thousands of Acres)		
Average, 1920-1925.	1,737	559		32.2
1920.....	1,960	554		28.3
1921.....	1,427	531		37.2
1922.....	1,695	515		30.4
1923.....	1,877	673		35.9
1924.....	1,706	482		28.3
1925.....	1,757	597		34.0

* Based on data in *Agricultural Yearbook*, 1926, p. 1024. For procedure used in computations see text.

Some imported commodities either could not be raised at all or could be produced only with great difficulty in this country because of lack of right climatic conditions, inadaptability of the soil, and inadequate supply of cheap labor, or for other reasons. Among the principal products belonging to this category, according to Table I, are raw silk, chocolate and cocoa, coffee, tea and rubber. The value of the imports of these commodities constitutes a very large part of the total value of imports into the United States. In regard to the production of some of these products in this country, such as silk, one may cite Adam Smith, as follows:

"The natural advantages which one country has over another in producing particular

TABLE VI.

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TABLE VI. ACREAGE DEVOTED TO PRODUCTION OF NET EXPORTS OF EIGHT CROPS, 1920-1925*

A Year or Period	B Total Acreage Harvested (Thousands of Acres)	C Acreage Devoted to Production of Net Exports		D Per cent. (C ÷ B)
		Total (Thousands of Acres)		
Average, 1920-1925.	256,264	42,507		16.6
1920.....	256,516	45,064		17.6
1921.....	257,730	56,385		21.9
1922.....	255,728	40,220		15.7
1923.....	257,865	34,126		13.2
1924.....	250,499	45,110		18.0
1925.....	259,247	34,135		13.2

* Based on data in Tables II, III, IV and V.

commodities are sometimes so great, that it is acknowledged by all the world to be in vain to struggle with them. By means of glasses, hotbeds, and hot walls, very good grapes can be raised in Scotland, and very good wine too can be made of them at about thirty times the expense for which at least equally good can be brought from foreign countries. . . . As long as the one country has those advantages, and the other wants them, it will always be more advantageous for the latter, rather to buy of the former than to make."⁴

However, a number of imported commodities, as seen from Table I, could be produced here. Among the most notable are dairy products, raw wool and mohair, flaxseed and sugar. Unfortunately, it is difficult to determine for most of these products, except flaxseed and sugar, the amount of land necessary for the production of their net imports.

We produce a large share of the flaxseed used in this country, but we also import a considerable quantity in order to supply all of our needs. According to Table VII, the average number of acres per year during 1920-1925 necessary to produce the net imports of flaxseed

amounted to 2,603,000, which exceeds the total average annual acreage harvested in that period. In 1925 the acreage necessary to produce the net imports of flaxseed was 2,756,000, or somewhat less than the total acreage harvested in that year. Undoubtedly, if we attempted to raise all our flaxseed, many difficulties would be met, but nevertheless this development is within the realm of possibility.

The problem in connection with sugar imports is somewhat more complicated. Our sugar supply is derived from a number of places, including our own country, our possessions (Philippines, Hawaii, Porto Rico and Virgin Islands), and foreign countries. In this country we produce cane sugar largely in Louisiana and beet sugar in various states. On account of climatic conditions and the nature of the soil, it would be almost impossible to extend the area of cultivation of cane sugar, but it is more likely that we could increase the acreage of beet sugar. Thus, we may assume that, if the net imports of sugar were eliminated, one-half of the deficiency could be made

TABLE VII. ACREAGE NECESSARY TO PRODUCE NET IMPORTS OF FLAXSEED, 1920-1925*

A Year or Period	B Total Acreage (Thousands of Acres)	C Acreage Necessary to Produce Net Imports		D Per cent. (C ÷ B)
		Total (Thousands of Acres)		
Average, 1920-1925.	2,089	2,603		124.6
1920.....	1,757	2,745		156.2
1921.....	1,108	3,122		281.8
1922.....	1,113	2,996		269.2
1923.....	2,014	2,399		119.1
1924.....	3,469	1,599		46.1
1925.....	3,078	2,756		89.5

* Based on data in *Agricultural Yearbook*, 1926, p. 870. For procedure used in computations see text.⁴ *Wealth of Nations*, Book IV, Chap. II.

up by the production of beet sugar in the United States and the other half could be supplied by a greater production of cane sugar in our possessions. The average number of acres per year during 1920-1924 (Table VIII) that would have been necessary to produce one-half of the net imports was 1,168,000, or nearly $1\frac{1}{2}$ times the total average annual acreage harvested during this period. In 1924, the last year for which complete data are available, the acreage needed to raise one-half of the net imports was 1,271,000, or more than half as much again as the total acreage harvested in that year. To extend the production of beet sugar in this way would mean enormous difficulties, but it is physically possible.

In other words, if we were to produce all of the net imports of flaxseed and one-half of the net imports of sugar, it would be necessary to put into cultivation about 4,000,000 acres.

Conclusion

Reviewing the results of the foregoing analysis, withdrawal from the export field, even when offset by increased production of imported commodities where feasible, apparently would throw a large acreage out of cultivation. The great gap in these comparisons, it should be reiterated, is the inability to translate certain leading exports and imports into land requirements for their production because of lack of acreage data. Probably, if these omitted commodities or at least those which are raised or could be raised in this country were included, it would be found that the acreage needed to produce these net exports would still exceed that needed to produce net imports. A conservative assumption would be that these acreages, if they could be com-

TABLE VIII. ACREAGE NECESSARY TO PRODUCE ONE-HALF OF NET IMPORTS OF SUGAR IN THE FORM OF BEET SUGAR, 1920-1924*

A Year or Period	B Total Acreage Harvested (Thousands of Acres)	C Acreage Necessary to Produce One-half of Net Imports	
		Total (Thousands of Acres)	Per cent. (C ÷ B)
Average, 1920-1924.	738	1,168	158.3
1920.....	872	1,052	120.6
1921.....	815	1,054	129.3
1922.....	530	1,330	250.9
1923.....	657	1,132	172.3
1924.....	817	1,271	155.6

* Based on data in *Agricultural Yearbook*, 1926, pp. 1003, 1006-1007. For procedure used in computations see text.

puted, would balance each other. Even on this basis, the computations indicate that a considerable area of land would become idle, for of the 34,000,000 to 43,000,000 acres liberated by the elimination of the net exports of the five leading cereals, and rice, raw cotton and unmanufactured tobacco only about 4,000,000 acres would be required to produce the net imports of flax and beet sugar, provided the readjustment could take place in such a way that the land so liberated could be adapted to the production of the latter products. In other words, between 30,000,000 and 40,000,000 acres, or from 9% to 12% of the total crop acreage, would be thrown out of cultivation altogether.

Such a change would mean further hardship to an industry that has been in a state of great depression for nearly eight years. It would mean that a large number of farms would have to be abandoned and that nearly 3,000,000 more people would have to leave the farms to seek employment in the cities.

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DEVELOPMENTS IN MUNICIPAL OWNERSHIP OF ELECTRIC PLANTS IN MINNESOTA

By HELEN E. HEGGIE

THIS study is the fourth of a series of articles dealing with municipal ownership in the electric light and power industry in certain states. Previous articles have traced the trend of the movement in Wisconsin, Massachusetts and Missouri.¹ While none of the three states in the earlier studies have shown any marked differences, other than the continuous increase in the number of municipal establishments in Massachusetts, there have been many variations. However, the trends revealed by the Minnesota study are strikingly similar to those in Wisconsin.

The number of instances of municipal ownership in the four states varies greatly. Massachusetts afforded but 45, Missouri 107, Wisconsin 116 and Minnesota which is by far the largest, 220 instances in all. In this study as in the others absolute accuracy is difficult to obtain because early records, even when available, are not absolutely complete, and the large number of instances further increases the difficulty in the case of Minnesota.²

Rise of Municipal Ownership in Minnesota

According to the information obtained for this study, the first municipally owned electric plant in Minnesota

appeared in 1886. A private company had served the community since 1882 and the municipality undertook to enter the field as a competitor four years later. It is interesting to note, however, that the private company disappeared, was probably absorbed by the municipal plant or else went out of business in 1899. The municipal plant in this community is still operating under public auspices and is the only establishment serving the community. Two years later the second municipal establishment began operation. From that time to the present with but two exceptions, 1890 and 1927, from 2 to 12 new establishments have been added each year to the number of municipally owned undertakings, and the grand total of instances for the entire period, 1886 to 1927, has reached 220. By 1900, 61 plants or over 28% of the total number of instances were in operation. At the end of the next decade 50% of the aggregate number were in operation. By this date (1910) only one plant had been taken over by private owners.

The greatest number of municipally owned establishments in any one year, 172, was found in 1923. In three of the next four years the number of municipal plants sold to private

¹ See 3 *Journal of Land & Public Utility Economics* 173-182 and 298-307 (May and August, 1927); also 4 *Journal of Land & Public Utility Economics* 139-146 (May, 1928).

² These data have been collected from a great many sources. McGraw Central Station Directory has been used to obtain information on the earlier period. Helpful lists of communities having municipally owned plants have been received from Mr. John Lapham of the North Central Electric Association. The publications of the League of Minnesota Municipalities, particularly *Minnesota Public Utility Rates: Electric—Gas—*

Water—Heat (August, 1922) and *Minnesota Electric Rates* (February, 1926) and *Minnesota Municipalities*, the monthly publication of the League, have been used extensively. Mr. Harold Laskey of the League has also obtained information about a number of the communities belonging to the League. Many conflicts were encountered from these sources and consequently a large number of questionnaires have been sent out. These were sent to plant managers, city clerks, mayors and postmasters and the information has been used to check our data and to settle points of difference.

owners exceeded the number of new establishments, so that in 1927 only 153 municipal establishments were recorded (Table

I). Most of the publicly owned establishments changing to private ownership in 1927 were merely distributing systems.

TABLE I. ANALYSIS OF EXTENT AND CHANGING CHARACTER OF MUNICIPAL OWNERSHIP OF ELECTRIC LIGHT AND POWER ESTABLISHMENTS IN MINNESOTA, BY YEARS: 1886-1927

YEAR	TOTAL NUMBER OF ESTAB- LISHMENTS IN EXIST- ENCE IN EACH YEAR*	NUMBER OF MUNICIPAL ESTABLISHMENTS ORIGINATING AS:				NUMBER OF ESTABLISHMENTS CHANGING FROM		ACTUAL NET INCREASE IN NUMBER OF MUNI- CIPAL ESTAB- LISHMENTS	NUMBER OF ESTABLISHMENTS (MUNICIPAL) CHANGING FROM			
		Private Estab- lish- ments	Municipal Establishments				Private to Municipal Own- ership		Municipal to Private Own- ership	Generat- ing All to Gen- erating Part	Generat- ing All to Gen- erating None	Generat- ing Part to Gen- erating None
			Total Num- ber	Gen- erating All	Gen- erating Part	Gen- erating None						
1886	1		1					1				
1887	1											
1888	2	2	1	1				1				
1889	4	2	2	2				2				
1890	6		1	1			1	2				
1891	9	1	3	3				3				
1892	15	2	6	5		1		6				
1893	18	2	3	3				3				
1894	23	1	5	5				5				
1895	32	1	8	8			1	9				
1896	35	1	3	3				3				
1897	38	2	2	2			1	3				
1898	47	2	9	9				9				
1899	50	1	2	2			1	3				
1900	61	2	10	10			1	11				
1901	66		5	4		1		5				
1902	71		2	2			3	5			‡	
1903	80		7	7			3	9				
1904	84	1	4	4				4				
1905	85		1	1				1		1	‡	
1906	88		3	3				3				
1907	91		2	2			1	3		1		
1908	97	1	5	3		2	1	6				
1909	102	1	5	4		1		5		2		
1910	107	1	3	2		1	2	5		2	‡	
1911	110		3	2		1		3				
1912	116		4	3		1	2	6		1		
1913	121	4	7	5		2	1	5		1		
1914	129	1	9	6		3		8	2	2		
1915	139	1	10	5		5	1	10	2	8		
1916	140	3	7	5		2	1	7	1	3		
1917	145		6	3		3	3	4	5	1	1	
1918	148	2	3	2		1	1	3	2	4		
1919	149	1	3	2		1		2	1	4		
1920	155	1	8	1		7	3	6		3	§	
1921	164	1	10	1		9	4	9		6		
1922	170		9	1		8	2	6		8	2	
1923	172		6	1		5	1	2		1		
1924	166		1	1			1	8†	—6	2		
1925	168		2	1		1	2	2	2	4		
1926	163		1			1		6	—5	2		
1927	153						1	11	—10	1		

* The distribution systems of Kenneth and Prior Lake, which were installed by the city but immediately leased to a private company before operation began, have not been included in the total number of establishments. The distribution system of Strandquist was not included because a private company is purchasing the system on the installment plan and is paying all interest on bonds. The establishment at Bronson, for which the city floated bonds, has not been included because a private company built and has always operated the establishment. The municipally owned street lighting establishment of St. Vincent has been excluded because no residential lighting is furnished.

† One establishment was leased to a private company and has been included as a private company.

‡ One establishment changed from generating none to generating all.

§ One establishment changed from generating part to generating all.

Origins of Municipal Plants.

Municipal ownership originates either by public construction or public purchase of the electric establishment. In Minnesota over 80% of the municipal plants were built under public auspices. Nearly one-fourth of the 127 plants which began as publicly owned and constructed generating stations continued to generate all their output. Fifty establishments of this class were ultimately purchased or served by private companies and all but seven of this

number changed directly from a self-sufficient municipal plant to a private establishment. The remaining establishments of this group experienced various vicissitudes, such as changing from generating all to generating part and then to generating none or all, while others omitted the intermediary step and shifted directly from generating all to generating none.

Another group of electric plants initiated as public undertakings began as mere distributing establishments which

TABLE II. ANALYSIS OF CHANGING CHARACTER OF MUNICIPAL OWNERSHIP OF ELECTRIC LIGHT AND POWER ESTABLISHMENTS IN MINNESOTA: 1886-1927

Total Number of Municipal Establishments in Minnesota, 1886-1927	220								
I. Number Originating as Private Establishments	38								
A. Number Changing from Private to Municipal Establishments Generating All of Output	24								
1. Number continuing to generate all of output		9							
2. Number changing from generating all of output		15							
a. to generating none of output			11						
(1) Number continuing to generate none of output				10					
(2) Number changing to private				1					
b. to generating part of output			1						
c. to private			3						
B. Number Changing from Private to Municipal Establishments Generating None of Output	14								
1. Number continuing to generate none of output		9							
2. Number changing to private		5							
II. Number Originating as Municipal Establishments	182								
A. Number Originating as Municipal Establishments Generating All of Output	127								
1. Number continuing to generate all of output		33							
2. Number changing from generating all of output		94							
a. to private establishments			43						
b. to generating none of output			45						
(1) Number continuing to generate none of output				40					
(2) Number changing from generating none of output to private				5					
c. to generating part of output			6						
(1) Number continuing to generate part of output				1					
(2) Number changing from generating part of output				5					
(a) to generating none of output					3				
(1) Number continuing to generate none of output						2			
(2) Number changing to private						1			
(b) to generating all of output						1			
(c) to private						1			
B. Number Originating as Municipal Establishments Generating None of Output	55								
1. Number continuing to generate none of output		44							
2. Number changing from generating none of output		11							
a. to generating all of output			3						
(1) Number continuing to generate all of output				2					
(2) Number changing to generating none of output				1					
b. to private			8						

bought all their current from some other, usually private establishment. Fifty-five such cases were recorded in Minnesota. Of these distribution systems only eight were later sold directly to private companies, while three installed generating equipment a few years after operations began. The remaining plants continued to purchase all their output throughout the entire period (Table II).

As in the other states already studied, a relatively small number of the municipal establishments began as private undertakings. Only 38 of these instances were found in Minnesota and of this number nine again reverted to private ownership. About one-fourth of the establishments of this group which began as privately-owned, self-sufficient plants have continued to generate all their output, while nine of the 14 cases which purchased their total output are still doing so (Table II).

Increased Use of Purchased Current

As was the case in Massachusetts, the first instance of a municipal enterprise which began merely as a distribution system occurred in Minnesota in 1892 (Table III). This is five years earlier than in Wisconsin and 10 years earlier than in Missouri. Although less than one-third of the municipal plants in Minnesota originated as distribution systems and although in 1905, which is about the mid-year of the period under consideration, only 1.2% of the entire number of plants in existence at that time were purchasing all their output, we find that 70% were purchasing all their current in 1927. This is evidence of the rapid development of "high-lines" throughout the state. It is also interesting to note that with the exception of 15 plants which purchased from other municipal establishments, practically all the current purchased by the re-

maining 92 plants was bought in 1927 from six large privately owned systems.

Usually an increase in the number of establishments purchasing all their output is accompanied by an increased number of sales of those plants to private companies. However, in Minnesota, of the 67 changes which have been made from municipal to private ownership, 46 have occurred when the muni-

TABLE III. NUMBER OF MUNICIPAL ELECTRIC LIGHT AND POWER ESTABLISHMENTS IN MINNESOTA GENERATING ALL, PART OR NONE OF CURRENT DISTRIBUTED, BY YEARS: 1886-1927

Year	Total Number of Establishments	Number Generating All	Number Generating Part	Number Generating None
1886	1	1		
1887	1	1		
1888	2	2		
1889	4	4		
1890	6	6		
1891	9	9		
1892	14	13		1
1893	17	16		1
1894	23	22		1
1895	32	31		1
1896	35	34		1
1897	38	37		1
1898	47	46		1
1899	50	49		1
1900	61	60		1
1901	66	64		2
1902	71	70		1
1903	80	79		1
1904	84	83		1
1905	85	84		1
1906	88	87		1
1907	91	89		2
1908	97	93		4
1909	102	95		7
1910	107	98		9
1911	110	100		10
1912	116	103		13
1913	121	105		16
1914	129	106	2	21
1915	139	101	4	34
1916	140	98	3	39
1917	145	98	2	45
1918	148	94	4	50
1919	149	90	4	55
1920	155	84	3	68
1921	164	75	3	86
1922	170	66	1	103
1923	172	62	1	109
1924	166	56	1	109
1925	168	52	1	115
1926	163	47	1	115
1927	153	44	2	107

cipal plants were generating all their current and only 20 at a time when they were purchasing their entire output.

The peak of the municipal ownership movement is too recent to determine whether the trend is definitely toward private ownership as seemed to be the case in both Missouri and Wisconsin, although not in Massachusetts. Only in the last four years, as stated previously, have the transitions to private ownership exceeded the additional municipal plants. In this period between 1923 and 1927, 15 establishments which purchased all their supply changed to private ownership, while only 11 self-sufficient plants made a similar change.

Comparison of the Trends of Municipal Ownership in Minnesota, Wisconsin, Missouri and Massachusetts

The foregoing tables and analysis have been carried through in a manner comparable to that used in the studies of Wisconsin, Massachusetts and Missouri and therefore afford opportunities for comparison. The period of study for all four states includes practically the same years. In Massachusetts, the oldest of the four states considered, the first instance of public ownership of electric plants was found in 1882, while in both

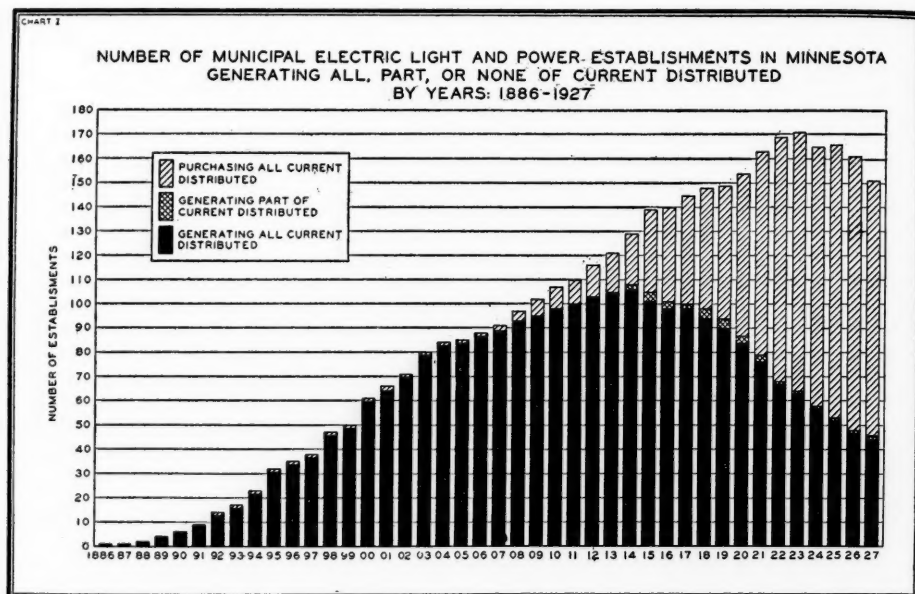
Minnesota and Missouri the first plant began operations four years later.

Study of the number of municipal establishments found each year shows interesting variations among the four states. Municipal ownership progressed much more rapidly in Massachusetts than in the other states in the years before 1900. By 1900, 40% of the aggregate number of publicly owned plants had already made their appearance in Massachusetts. Missouri was next in line with 30% in the same year, while Minnesota showed 28% and Wisconsin lagged behind with but 13%. At the end of the next decade we find Massachusetts still heading the list with 64% of its total number of municipal establishments included in the count. Wisconsin, however, showed the greatest increase in this 10-year period (1900-1910) during which 49% of the number of instances of municipal ownership were found, making a total of 62% appearing by 1910. In the same year Missouri had 58%, while Minnesota was last with only 50% of the establishments in operation.

In the movement away from municipal ownership, Massachusetts again attracts attention for only three changes to private ownership or but 6% of the aggregate number are recorded in the

TABLE IV. PERCENTAGE DISTRIBUTION OF MUNICIPALLY OWNED ELECTRIC ESTABLISHMENTS IN FOUR STATES, BY CLASSES OF ESTABLISHMENTS AND PERIODS, 1900-1927 INCLUSIVE

YEAR	MINNESOTA			WISCONSIN			MISSOURI			MASSACHUSETTS		
	Stations Generating All of Current	Stations Generating Part of Current	Stations Generating No Current	Stations Generating All of Current	Stations Generating Part of Current	Stations Generating No Current	Stations Generating All of Current	Stations Generating Part of Current	Stations Generating No Current	Stations Generating All of Current	Stations Generating Part of Current	Stations Generating No Current
1900.....	98.4%	.....	1.6%	93.3%	.....	6.7%	100.0%	.....	.....	77.7%	.....	22.3%
1905.....	98.8	.....	1.2	96.0	.....	4.0	97.9	.....	2.1%	82.6	.....	17.4
1910.....	91.6	.....	8.4	94.4	1.4%	3.1	98.3	.....	1.7	62.0	.....	38.0
1915.....	72.7	2.9%	24.4	76.2	8.9	14.9	87.9	1.2%	10.9	43.5	.....	56.5
1920.....	54.5	1.9	43.6	45.5	14.8	39.7	80.2	2.6	17.2	21.9	7.3%	70.8
1925.....	30.9	.6	68.5	15.9	19.2	64.9	66.1	3.2	30.7	.....	26.1	73.9
1927.....	28.6	1.4	70.0	18.1	10.3	71.6	60.7	7.1	32.2	4.4	20.0	75.6



entire period. Missouri, on the other hand, goes to the opposite extreme with nearly 50% of the establishments transferred to private owners in the 41 years. The two lake states showed a similar tendency in this movement for 30% of the municipal plants in Minnesota and 25% in Wisconsin are now private enterprises.

In comparing the character of municipal ownership in the four states marked differences appeared. Massachusetts is the first state to show a municipally owned establishment purchasing all its current and, by 1900, 22.3% of the number of establishments obtained their power in this way. Similar figures for Wisconsin and Minnesota were 6.7% and 1.6% respectively (Table IV). Although the Massachusetts establishments depended a good deal on purchased current early in the period, the tendency to shift to private ownership which is rather marked in the other three states was of minor importance. Indeed in 1927 all but 4.4% of the establish-

ments in Massachusetts depended to some degree at least on private establishments for their electric supply, while at the same time the number of municipal undertakings reached the highest figure in the 40-odd years studied. Minnesota and Wisconsin again exhibit a marked similarity in the percentage of plants generating all and purchasing all in the various years (Table IV). However, Minnesota never shows more than 3% of its establishments in any one year generating part and purchasing part of their current and in this respect is peculiar. Missouri seems to be following Wisconsin and Minnesota in the changing character of the plants, though the movement from generating all to generating part to generating none is a great deal slower. The number of self-sufficient plants has decreased very rapidly in Massachusetts, but not at such a rapid rate in Minnesota and Wisconsin, and much more slowly in Missouri.

CORRELATION OF PHYSICAL AND ECONOMIC FACTORS AS SHOWN BY MICHIGAN LAND ECONOMIC SURVEY DATA

By WADE DeVRIES

THE Michigan Land Economic Survey is unique in the opportunity it affords for the correlation of forest, soil, and economic data. A county is taken as the unit of operations during a single field season. While a map is made by one group of men showing the location of forest types and cleared land, a second map is made by another group showing the location of all soil types and the lay of the land, and still other maps are made by the land economist showing such economic data as intent-in-land-ownership, assessed valuation, tax delinquency, and tax rate. These maps are made by an actual inspection of the natural features or review of the official records with sufficient care and thoroughness so that the mapping is accurate in detail for individual tracts of 40, 20 and even 5 acres. The field compilation of these three types of maps is made independently by different investigators who attempt no intercorrelation of the data during the course of their field work. However, even in the very first county inventoried by the Land Economic Survey a very marked degree of correlation between these three types of maps was apparent to any one who was familiar with the reading and interpretation of maps.

In order to make this correlation clearer the detailed soil and farm-forest maps were combined into a more simple map of the natural districts which represent definite associations in nature of soil, drainage, topography, and natural forest cover. The boundaries between

such districts are not general boundaries, but rather the detailed lines established in the field as marking the separation of different soil-forest type associations. The natural conditions within each district are thereby placed in marked contrast to the natural conditions within every other district, while at the same time retaining a distinct unity of character for each individual district. For purposes of ready reference and identification, each of these districts has been named after its most conspicuous natural feature.

By placing a map of the natural districts (Chart I) beside maps of intent-in-ownership and of assessed valuation, a correlation is easily apparent between these natural and economic factors. The coefficient of correlation between these factors might be worked out from the great number of individual cases shown on such maps, but the Land Economic Survey is not particularly interested in the correlation as such. However, the major interest lies in determining the relative productivity of the various natural districts without the necessity of expressing a personal opinion which would very probably be open to serious criticism.

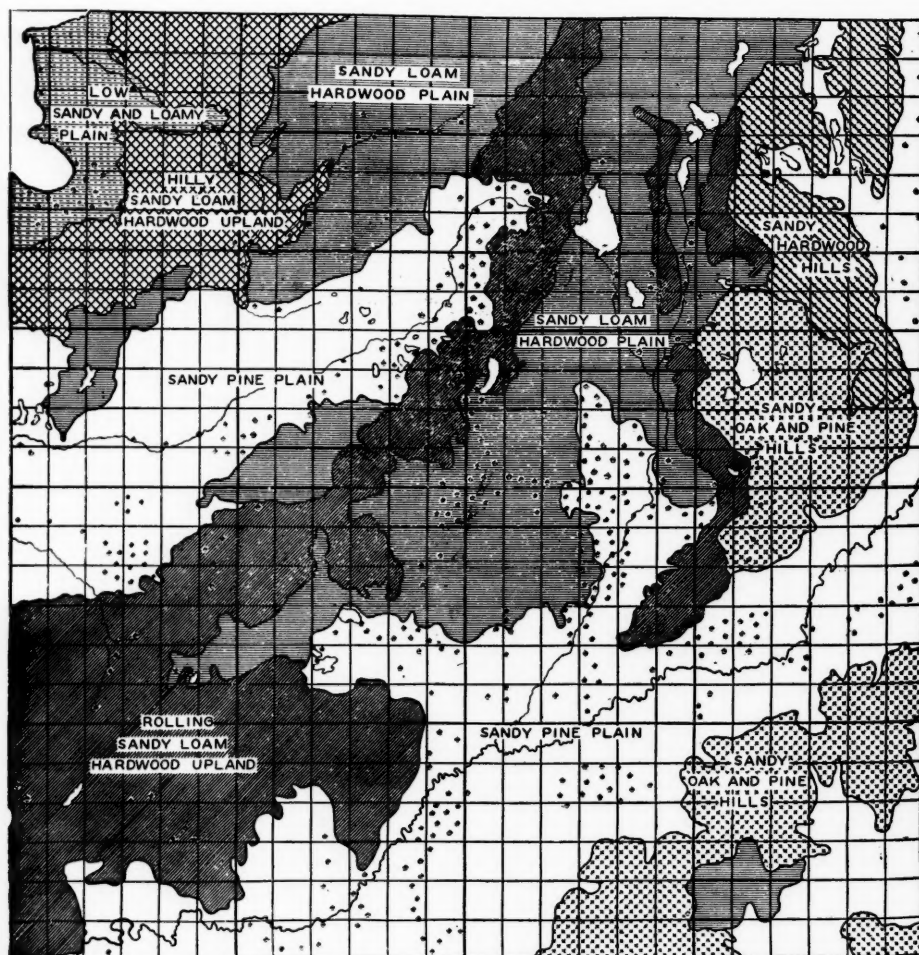
The three counties most recently covered by the Land Economic Survey have been generally open to farming settlement for the past 60 years. Farming has been attempted many times on all of the natural districts in these counties. It would seem to be entirely fair to let 60 years of practical experience with the

land answer the question of relative suitability of the various types of land for agricultural development. The percentage of the land area of each natural district that is now in farms or that was once in farms and is now abandoned is one expression of the productive value of the land.

Another source for obtaining an unbiased expression of the relative produc-

tive value of the land in each natural district is in the local assessment for taxation purposes. The local assessor bases his assessed valuation largely on his own experienced judgment, but through the operation of the local board of equalization his assessment is brought into substantial agreement with the community's judgment of the values of the present and future utility of any parcel of

CHART I. MAP OF NATURAL DISTRICTS, KALKASKA COUNTY, MICHIGAN.



* DESIGNATES THE OCCURRENCE OF FROM 40 TO 80 ACRES OF SWAMP & OTHER WET LANDS

TABLE I. CORRELATION OF PHYSICAL AND ECONOMIC FACTORS*

A	B	C	D	E	F	G	H	I	J	K
Natural District	County	Amount of Land		Amount of Farm		Valuation per		Valuation per		Average
		in Farms	Rank	Land Abandoned	Rank	Acre in Farms	Rank	Acre of Wild Land	Rank	Rank of Natural District
Clay	Chippewa	67	1	2	1	\$26.50	1	\$10.50	1	1
Shore Border	Chippewa	17	7	6	2	14.50	4	8.60	3	4
Rolling Sandy Loam	Kalkaska	54	2	19	5	13.90	5	6.35	7	4¾
Hardwood Upland										
Sandy Loam Hardwood	Kalkaska	34	5	27	8	12.30	6	5.95	9	
Plain	Crawford	51	3	26	7	18.05	3	8.00	4	5¾
Hilly Sandy Loam Hardwood	Kalkaska	41	4	33	9	8.90	10	8.75	2	6¼
Upland	Kalkaska	30	6	34	10	12.10	7	7.90	5	7
Low Sandy and Loamy										
Plain	Chippewa	13	8	14	4	8.50	11	6.70	6	7¼
Sandy Hardwood Upland	Crawford	8	10	55	14	18.60	2	6.05	8	8½
Loamy Hardwood Tablelands with Sandy Valley Slopes										
Mixed Sand Swamp Clay	Chippewa	3	13	11	3	10.10	8	5.50	10	8½
Transitional										
Loamy Sand Oak and	Crawford	6	11	41	11	9.60	9	4.35	13	11
Pine Upland										
Stony	Chippewa	11	9	23	6	3.40	16	3.20	18	12¼
Sandy Hardwood Hills	Kalkaska	4	12			5.80	14	4.75	12	12¾
Sandy Pine Plain	Chippewa							3.30	17	
	Kalkaska	8	10	48	13	5.60	15	3.85	14	13
	Crawford	3	13	44	12	8.40	12	4.90	11	
Sandy Oak and Pine Hills	Kalkaska	1	14	89	16	2.85	17	3.80	15	
	Crawford	1	14	57	15	6.90	13	3.35	16	18¾

* Location, such as nearness to large towns, has practically no influence on the valuation of the land in these counties. Some of the lowest assessed values in each county were found to be adjacent to the county seat.

land. It has been found that in placing the valuation on wild or unimproved cut-over land, the assessor generally has in mind possible future value for agricultural purposes, the same as in assessing land in farms.

Table I is a result of the correlation of natural districts with the sum of local experience in land utilization during the past 60 years. This local experience is expressed in such simple economic factors as percentage of land in farms, percentage of land which was once in farms but is now in abandoned farms, average assessed valuation per acre of owner-operated farms, and average assessed valuation per acre of wild, unimproved cut-over land not in farms. The relative rank in productive value of each of the natural districts as expressed by the economic factors mentioned is shown in columns D, F, H and J.

The three counties used as examples are: Chippewa County, one of the best agricultural counties in the upper peninsula of Michigan; Kalkaska County,

an average northern county of the lower peninsula; and Crawford County, one of the poorer agricultural counties in the lower peninsula. These three counties together should give a composite picture of northern Michigan conditions. Fourteen natural districts in these three counties were recognized from the detailed soil and forest maps of the Land Economic Survey. Two of these districts occur in both Kalkaska and Crawford Counties, and one other, the Sandy Pine Plains, occurs in all three counties. Let us note the correlation between the physical and economic factors in a few of the natural districts in this table.

The Clay District of Chippewa County is an area of heavy clay loam soils with nearly level topography. It has the largest percentage of its land in farms and the smallest percentage of farm land abandoned of any of the 14 districts. The average valuation per acre of farm land and of wild land is higher than in any other district. Considering the nature of the land utiliza-

tion and the valuations placed upon the land by the local assessors, this district would seem to be the most suitable of any for farming development.

The Rolling Sandy Loam Hardwood Upland is the principal farming district of Kalkaska County. The abandonment of farms is more common here than in the best farming districts (Clay and Shore Border) of Chippewa County, and yet it is not as common as in the other districts of Kalkaska County. The assessors have accordingly placed a higher average valuation upon the farm land in this district of Kalkaska County than on the farm land of any of the other districts of that county; but, on the other hand, it is a lower valuation than that of either the Clay or Shore Border Districts of Chippewa County.

The Sandy Loam Hardwood Plain of Crawford County makes up only a little over 1% of the area of this county. However, in Kalkaska County this same natural district constitutes 20% of the area of the county and is large enough to be representative of conditions of land utilization in this district.

The Hilly Sandy Loam Hardwood Upland of Kalkaska County has a smaller percentage of its area in farms and proportionately more farm abandonment than the Rolling Sandy Loam Hardwood Upland in the same county. The reason for this may be traced almost entirely to the rougher topography in the former district. The valuation of the farm land is decidedly lower in the Hilly Hardwood Upland than in the Rolling Hardwood Upland, but the wild land valuation is higher in the former. By the process of selection, only the least desirable portions of the Rolling Hardwood Upland remain wild cut-over land, while in the Hilly Upland the process of selection has not gone so far; the wild land of better quality has not all been

put into farms. The wild land in the Hilly Hardwood Upland is of practically the same valuation as the farm land, while in the Rolling Hardwood Upland it has less than half the valuation of the farm land.

The Mixed Sand Swamp Clay Transitional District of Chippewa County is marked by great local variability. Its transitional nature, lying between the Clay District and the Sandy Pine Plain, creates definite boundaries for this district. The persistence with which its small patches of sand and of clay are scattered through the larger areas of swamp give it a decided unity of character. Only a small percentage of the land is in farms, but what farm land is found is of relatively high value and is located almost entirely on the small patches of clay land.

The Stony District of Chippewa County consists of areas of shallow limestone soils. These soils are very fertile but their extreme stoniness accounts largely for the very low valuation of the land in farms. The unpromising nature of the wild cut-over land as far as future farm development is concerned is reflected in its low average valuation.

The Sandy Hardwood Hills of Kalkaska County have been but very recently utilized for farming purposes. All of the farms in this district still are pioneer farms and their persistence is problematical. The instability of the agriculture of this district at its present stage of development is made evident by the small difference between the valuation of the land in farms and of the wild cut-over land. No farm abandonment has yet developed in this district.

The Sandy Pine Plain occupies large areas in all of the three counties. This district is in all cases very low in percentage of land in farms, and high in proportion of farm land abandonment. In

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Chippewa County less than one-tenth of one per cent of the Sandy Pine Plain is in farms, an area too small to be considered in the correlation in Table I. In Crawford County, one-fourth of the Sandy Pine Plain farm land is on four small areas with clayey subsoil (located on the natural district map). These areas are associated with the Sandy Pine Plain and have been included in this natural district for the purpose of simplifying the classification. Sixty-five per cent of these clayey subsoil areas are in farms, as compared with 3% for the Pine Plain as a whole. It is of interest to notice how nearly alike the assessors have valued pine plain land in these three counties.

The Sandy Oak and Pine Hills in Kalkaska and Crawford Counties have the lowest percentage of land in farms and the highest proportion of farm abandonment to be found in any of the 14 natural districts. The values of farm land and wild land are also extremely low in this natural district. In Kalkaska County the farm land in this district has received a lower average valuation than that of the wild land. This is explained by the fact that all the land in farms in this district of Kalkaska consists of the unimproved portions of farms extending back upon the sandy Oak and Pine Hills.

The relative productivity of each natural district is shown by the average rank in the last column of Table I. This is an expression of the local appreciation of the suitability of the natural environ-

ment for agricultural use. It is a definite expression based upon a combination of the results of 60 years of land ownership and utilization and of expert local opinion as to relative land values. On the other hand, the Land Economic Survey bases its classification solely upon the observable physical characteristics of the land itself and without any consideration of probable utility. The mapping based upon this sort of a classification was the basis for drawing the boundaries of each of the natural districts. It is significant that the Land Economic Survey's description of these 14 natural districts has been such that the outsider, familiar only with general farming practice and having farming utility in mind, would place these natural districts in the same order of rank as that shown in Table I. This is the ranking for utilization value that has been tested by past experience and is supported by the judgment of the local people who are most thoroughly acquainted with local conditions.

Table II shows how widely the average figures for a natural district vary from average figures for a political unit.

The statement that 22% of the land area of Chippewa County is in farms is true as a generalization but it does not give an accurate picture of the situation in this county. In the Clay District, occupying 22% of the area of the county, 67% of the land is in farms, while in another natural district equally as large only 3% of the land area is in farms, and in still another district of over 100,000

TABLE II. PRODUCTIVITY FIGURES BY COUNTIES.

County	Percentage of Land in Farms	Percentage of Farm Land Abandoned	Valuation per Acre in Farms	Valuation per Acre of Wild Land
Chippewa.....	22%	6%	\$20.75	\$6.10
Kalkaska.....	24%	30%	11.80	4.70
Crawford.....	5%	44%	11.70	4.70

acres only 80 acres are in farms. Average figures for Chippewa County as a whole would not even approximate the true conditions in any one district of the county. Table I shows a variation in the average valuation of wild land in two different districts of the same county of over 200% and yet the variation between the average valuation of the wild land in the same district of three different counties is less than 50%. Tables I and II illustrate the futility of using political units as a basis of comparison and correlation when an adequate inventory survey of soil, drainage, topography and forest cover of the area is available. Such an inventory survey is needed for all parts of a state, for it is difficult to make a sound interpretation of economic conditions without it.

The figures in Table I, set down beside the Land Economic Survey description of natural districts, seem to show that the local assessors really do a good job in placing a comparative value (if

not a "real" value) on the lands in their local district. Individual inequalities may appear from time to time, but sooner or later they are eliminated. Local people do understand the advantages and handicaps inherent in their county or region, but have been unable to picture them for others. Because it is based upon a detailed inventory survey, the complete correlation and simple comparison of natural with economic data eliminate individual judgment and personal opinion and, thereby, create a more dependable method of appraising the agricultural utility of land.

The Land Economic Survey's experience in every one of the nine northern Michigan counties which it has covered indicates that an adequate inventory survey which carefully recognizes and maps the differences in soil, topography, farm development and forest cover, recreational, and water resource possibilities should and will correlate with long-time local experience.

A CYCLE IN THE ECONOMIC HISTORY OF PUBLIC UTILITIES, 1914—1922

By GEORGE C. BROOK

THE rapid price changes during the war and post-war periods naturally affected the prosperity of public utilities. The events of these years re-emphasize that these businesses are stable and prosperous only in a relative sense. Because they fill a public need and because their operations are subject to governmental regulations does not make them totally immune to the influences which cause fluctuations in business in general. Even after this fact became plain to the general public, laymen appeared perplexed to understand why the electric railway industry floundered so desperately, while the electric light and power industry survived so well, and why the economic condition of the gas, telephone and telegraph industries should vary.

The elements of strength and weakness, more or less peculiar to each type of utility, which help to explain the differing reactions to these price changes have frequently been recounted. To some extent, also, quantitative studies of costs and earnings since 1914 have been offered in substantiation of certain explanations. Without offering explanations which would involve too detailed description of obvious characteristics of each utility, the following compilation of data taken from company reports to the commissions is presented as an addition to the quantitative record of the period. Only the years 1914 to 1922, inclusive, are taken, for in these years are found the most rapid price changes. Moreover, these years roughly mark off a complete cycle from prosperity through depression to at least the beginning of recovery.

Valuable as a parallel analysis would be for the utilities other than those named—electric railway, electric light and power, gas, telephone and telegraph—the diversity of accounting and reporting practices and the failure of commissions to publish data on capitalization makes such a procedure impossible. Furthermore, the companies whose reports are included are found in the restricted number of states whose commissions made the information available.

Bearing in mind these qualifications, a comparison has been made among the following income and expense items: (1) Operating revenue, which for this compilation is taken as gross operating receipts; (2) Operating expenses, excluding taxes and non-operating expenses; (3) Net operating revenue, the difference between operating revenue and operating expenses; (4) Taxes, including all types, such as property, franchise, income; (5) Net income, or the final amount available for dividends and surplus.

Of the four types of utilities covered—transport, gas, electricity, and communication—the electric railways, as is now well known, suffered most. In seven states company reports when aggregated showed a deficit during at least two years. In New York this deficit extended over five years, and in California and Oregon over six years. Table I shows the changes in earnings of electric railways and the percentage increase or decrease of each item relative to 1914.

Operating revenue and net income in this industry moved in reverse directions

TABLE I. EARNINGS OF ELECTRIC RAILWAYS WITH PERCENTAGE INCREASE OR DECREASE RELATIVE TO 1914*

YEAR	OPERATING REVENUE		OPERATING EXPENSES		NET OPERATING REVENUE		TAXES		NET INCOME	
	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914
1914	\$302,982,919	.....	\$190,610,390	.....	\$112,372,529	.....	\$16,560,713	.....	\$32,993,518	.....
1915	294,723,030	- 2.75	190,112,452	- .26	104,610,578	- 6.9	17,902,070	8.09	22,961,375	-30.41
1916	321,764,353	6.2	207,639,560	8.9	114,124,793	1.55	20,616,965	24.49	28,480,828	-13.67
1917	346,629,412	14.4	240,095,037	25.96	106,534,375	- 5.19	20,971,691	26.63	20,471,280	-37.96
1918	364,612,408	20.33	264,538,519	38.77	90,073,889	-19.83	22,141,594	33.74	1,612,800	-95.01
1919	431,098,912	42.27	331,973,318	74.16	99,123,694	-11.78	24,899,221	50.35	7,610,168	-76.95
1920	484,984,927	60.6	391,048,734	105.16	93,936,193	-16.4	28,203,222	70.3	4,203,013	-87.27
1921	448,387,297	48.0	354,924,431	86.1	93,462,866	-16.81	27,529,422	66.23	7,133,233	-78.39
1922	444,949,820	46.8	342,848,834	79.87	102,100,976	- 9.13	29,083,144	75.61	15,558,290	-52.84

* States included: Connecticut, New Jersey, Maryland, New York, Massachusetts, New Hampshire, Maine, Rhode Island, Virginia, West Virginia, Ohio, Michigan, Indiana, Wisconsin, Nebraska, Kansas, California, Oregon.

during these eight years, while the opposite was generally true of the other utilities. The striking thing was that this tendency occurred despite a percentage increase in operating expenses and taxes that was small compared with the corresponding increases in the other utilities. In 1921 and 1922 the data show an improvement in the net income position of electric railways, although the income and expense items remained much out of line from their normal relationship in 1912 to 1914.

From the standpoint of earnings the electric light and power companies apparently came through the cycle of prosperity and depression in the best position of all types of utilities considered. Net income, for the companies

included, increased in amount every year with the exception of 1918 when a slight decrease was recorded. Aside from this steady rise of net income, the other outstanding fact was the increase in the item of taxes, the percentage increase from 1914 being greater than for the other types of utilities. The phenomenal development of the industry is well reflected in the data shown in Table II.

The figures for gas companies (Table III) show the industry's moderate capacity for weathering the price revolution during these years. One marked feature of the table is the greater percentage increase of operating expenses than in any other type of utility included in this study. Notwithstanding this increase and a rise in the tax figures

TABLE II. EARNINGS OF ELECTRIC LIGHT AND POWER COMPANIES WITH PERCENTAGE INCREASE OR DECREASE RELATIVE TO 1914*

YEAR	OPERATING REVENUE		OPERATING EXPENSES		NET OPERATING REVENUE		TAXES		NET INCOME	
	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914
1914	\$85,800,301	.....	\$44,510,561	.....	\$41,289,740	.....	\$4,001,163	.....	\$12,779,555	.....
1915	91,152,490	6.23	47,159,025	5.95	43,993,465	6.54	4,160,506	4.0	16,977,344	32.78
1916	99,089,046	15.49	53,389,934	19.95	45,699,112	10.68	5,185,773	29.62	17,277,675	35.14
1917	110,002,309	28.2	61,038,733	37.14	48,963,576	18.58	6,835,317	70.85	17,000,533	32.97
1918	124,564,689	45.18	72,485,643	62.86	52,079,046	26.12	9,111,404	127.75	16,864,801	31.91
1919	147,474,681	71.76	88,119,925	98.0	59,354,756	43.74	10,197,934	154.92	19,139,367	49.67
1920	176,081,174	105.22	90,742,181	103.89	85,338,993	106.65	12,939,537	223.47	23,357,039	82.63
1921	197,209,249	129.85	102,050,849	129.3	95,158,400	130.44	16,634,659	315.85	27,684,467	117.43
1922	223,228,407	160.17	117,133,091	163.19	106,095,316	156.91	18,835,462	370.85	35,003,225	172.39

* States included: Connecticut, New Hampshire, New York, New Jersey, Maryland, Indiana, Wisconsin, California, Oregon.

TABLE III. EARNINGS OF GAS COMPANIES WITH PERCENTAGE INCREASE OR DECREASE RELATIVE TO 1914*

YEAR	OPERATING REVENUE		OPERATING EXPENSES		NET OPERATING REVENUE		TAXES		NET INCOME	
	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914
1914	\$58,165,661		\$34,265,950		\$23,899,711		\$2,943,698		\$9,772,512	
1915	60,055,752	3.24	34,731,690	1.07	25,324,062	5.95	3,273,726	11.37	10,396,866	6.36
1916	68,593,709	17.76	39,636,746	15.65	28,866,963	20.78	4,177,492	42.55	12,023,865	22.96
1917	76,631,656	31.72	47,276,745	37.93	29,354,816	22.82	4,701,722	60.62	10,703,491	9.48
1918	92,391,242	58.8	61,798,072	80.26	30,593,170	28.0	6,348,659	117.41	8,520,831	-12.77
1919	97,123,677	66.93	65,449,983	90.9	31,673,694	32.52	7,258,471	148.75	10,786,369	10.33
1920	123,415,879	112.11	90,246,778	163.2	33,169,801	38.78	8,814,912	202.44	11,051,006	13.04
1921	133,727,797	129.83	94,476,180	175.51	39,251,617	64.23	10,811,895	271.31	13,109,617	34.05
1922	144,563,047	148.44	97,709,688	184.96	46,853,359	96.03	12,889,752	342.96	19,362,185	97.84

* States included: New Hampshire, Connecticut, New York, New Jersey, Maryland, California, Oregon.

second only to that in the electric industry, the net income position of the industry at the end of the period, so far as percentage changes are concerned, appeared better even than the telephone and telegraph utilities. Many interesting features of gas utility operations and policies throw light on the experience of this industry during these years and subsequently, but these matters are outside the scope of this study.

Telephone and telegraph companies, like the gas and electric utilities, continued to gain in earning capacity except for two slight recessions in 1918 and 1920 (Table IV). The years from 1914 to 1916 appeared profitable on the whole. Beginning in 1916, however, operating expenses gained steadily on revenues

with the result that 1920 represents the year of maximum recession in net income. By the end of 1922, the income items again assumed something like normal relations, with the exception of taxes which continued to soar, although not to the high point recorded for either electric or gas utilities.

The nine years from 1914 to 1922, inclusive, fall logically into three periods (Table V). In the first period, 1914-1916, the maladjustment of the items noted was relatively minor, the increased volume of business producing an increase in net income.

During the second period, 1917-1920, the full effect of war conditions was felt, and, although the utilities grew tremendously, operating expenses increased in

TABLE IV. EARNINGS OF TELEPHONE AND TELEGRAPH COMPANIES WITH PERCENTAGE INCREASE OR DECREASE RELATIVE TO 1914*

YEAR	OPERATING REVENUE		OPERATING EXPENSES		NET OPERATING REVENUE		TAXES		NET INCOME	
	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914	Amount	Percentage Change from 1914
1914	\$343,821,559		\$240,029,911		\$103,791,648		\$16,506,768		\$136,243,351	
1915	399,829,762	16.29	257,812,717	7.41	142,017,045	36.82	17,469,579	5.83	147,634,053	8.52
1916	422,827,534	22.98	269,331,956	12.21	153,495,578	47.88	20,676,408	25.26	163,710,177	20.16
1917	486,462,612	41.48	317,657,177	32.34	168,805,435	62.63	34,664,977	110.0	161,726,948	18.87
1918	529,482,243	54.0	370,564,409	54.39	158,918,834	53.1	35,008,528	112.13	159,020,046	16.72
1919	615,595,222	79.05	442,030,354	84.16	173,564,668	67.21	38,257,584	131.82	171,921,464	26.12
1920	725,545,770	111.02	532,036,806	130.0	173,508,964	67.16	38,532,744	133.49	168,916,289	23.98
1921	740,430,797	115.36	555,717,562	131.54	184,713,235	77.95	43,019,212	160.67	183,751,304	34.89
1922	813,299,121	136.55	595,333,803	148.04	217,965,318	110.0	52,947,447	220.84	233,214,650	71.19

* States included: New Hampshire, Connecticut, New York, New Jersey, Maryland, Indiana, Wisconsin, California, Oregon.

far greater proportion than operating revenue. Operating expenses consist mainly of labor and material, though these items vary in importance among

TABLE V. AVERAGE ANNUAL PERCENTAGE INCREASES OR DECREASES RELATIVE TO 1914

Type of Utility	Operating Revenue	Operating Expenses	Net Operating Income	Taxes	Net Income
Electric Railways					
1914-16...	1.2	3.0	-1.8	13.3	-14.9
1917-20...	34.3	61.0	-13.2	45.4	-74.1
1921-22...	47.3	83.1	-13.2	72.7	-65.0
Electric Light and Power Companies					
1914-16...	7.2	8.5	5.8	7.5	23.6
1917-20...	62.5	75.2	48.3	143.7	51.1
1921-22...	144.7	146.0	143.3	359.0	144.0
Gas Companies					
1914-16...	7.4	5.8	8.9	13.8	10.3
1917-20...	68.1	92.4	62.1	132.7	8.2
1921-22...	140.5	180.0	80.0	313.8	64.9
Telephone and Telegraph Companies					
1914-16...	13.1	6.5	28.1	10.9	9.6
1917-20...	71.3	75.3	62.8	122.7	21.5
1921-22...	125.8	140.0	94.1	190.3	53.0

the utilities, and the great competition for both of these for war and industrial purposes was responsible for much of the maladjustment reflected in the tables. Nevertheless, the capacity of the industries to meet these conditions, while affected by more fundamental con-

siderations, was also influenced by the attitude and powers of regulatory commissions over rates. Theretofore, commissioners generally had conceived their task in terms of protecting consumers from the utilities. The price changes of the period complicated this task by the necessity for greater consideration for the investors' interests. The slowness with which commissioners adapted themselves to these altered circumstances was a factor of considerable weight in the lag of rates behind mounting expenses.

The third period in the cycle, 1921-1922, marks the beginning of a period of readjustment, numerous agencies combining to help better the earning power of utilities so that they could survive and perform their public functions. Except for telephone and telegraph companies, 1918 was the worst year from the standpoint of net income. In the field of communications, 1921 appears to have been the worst. At the close of 1922 the vigorous efforts of utility managers and state commissions to ameliorate wartime ills were beginning to bear fruit. The big drop in prices in 1920 facilitated progress toward more normal conditions. With the recession of costs, rate decreases again occurred but usually with a lag behind declining costs.

LAND CREDIT IN WALNUT GROVE TOWNSHIP, KNOX COUNTY, ILLINOIS

By DAVID ROZMAN*

ALTHOUGH Walnut Grove Township in Knox County, Illinois, was settled somewhat earlier than the Town of Newton in Manitowoc County, Wisconsin, only a few mortgages in the former township were found on record before 1850. The study of mortgage indebtedness from 1850 to the present time for both townships is therefore comparable. As in the Wisconsin township, the information was found in the mortgage records of the county government. However, the time for gathering data on land credit in Knox County was so limited that only 27 sections out of the 36 were selected for study. Nevertheless, the selection was made in such a way that all parts of the township were represented. Section 16, being occupied by the town of Altona, was omitted in both the land tenure study and the present study of mortgages.

Altogether 726 mortgages were recorded for the 27 sections during the period from 1850 to 1925, inclusive. For practically the same period 2,294 mortgages were recorded in Newton. Assuming that the omitted nine sections had the same number of mortgages per section as the 27 studied, it will be noted that the Wisconsin community had placed almost $2\frac{1}{2}$ times as many mortgages on

the same area of land as had the Illinois township. This is partly explained by the fact that the farms of Walnut Grove are larger and therefore less numerous than in Newton, and also by the fact that the Wisconsin farmers' system of land tenure enabled them to make more use of mortgage credit.

Sources of Mortgage Loans

The sources of mortgage loans are indicated on Charts I and II. The classification into residents, non-residents and "institutions" is the same as that used in the previous land credit study. Individual residents of the townships contributed 43.4% of the entire mortgage loans for the period as a whole, while the remaining amount was furnished by the two other sources in about equal parts. It will be recalled that in Newton about 85% of all loans were made by local residents.

In the Illinois township local money was of special significance in the period between 1860 and 1880, when about 60% of the funds were contributed by residents. For the next 30 years from 50 to 58% was obtained from this source. A sharp decline in the importance of this form of credit is registered in the next 16 years; in fact only 6% of the money was obtained from local residents in the post-war period, 1920 to 1925. The introduction of Federal Land Banks and the rapid rise of land values, which necessitates the placing of large mortgages whenever land is transferred, have undoubtedly been largely responsible

* *Editorial Note:* This study is another unit of the Land Tenure Studies of the Institute. The two previously published articles which bear most directly on the present study are: David Rozman, "Land Credit in the Town of Newton, Manitowoc County, Wisconsin, 1848-1926," 3 *Journal of Land & Public Utility Economics* 371-384 (November 1927); and William Ten Haken, "Land Tenure in Walnut Grove Township, Knox County, Illinois," 4 *Journal of Land & Public Utility Economics* 13-24, 189-198 (February and May, 1928).

for the decline in the importance of local lending on land.

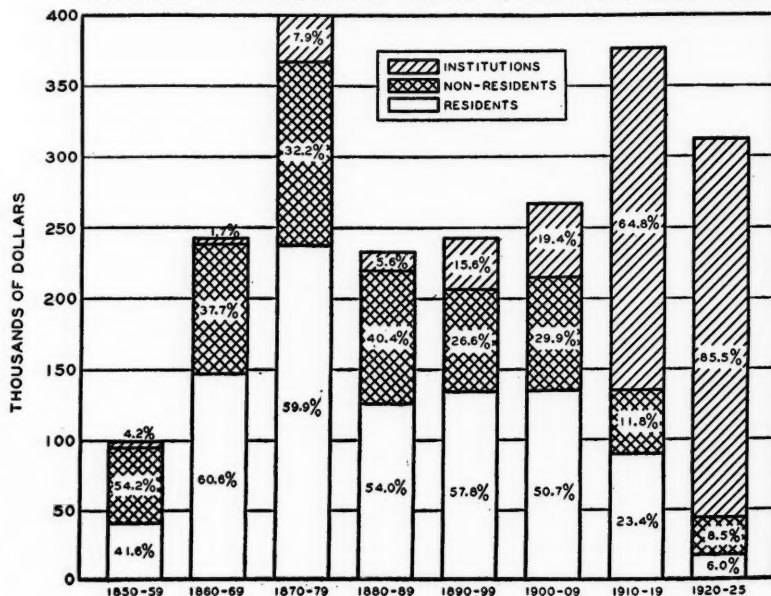
Non-resident individual lenders were a very important source of mortgage loans during the first decade under consideration, when they furnished 54.2% of the total; until 1910 the percentage of the total supplied in this manner ranged from 26% to over 40% per decade. During the latter part of the period this source of land credit, like that of local credit, also declined very strikingly. Only 9% of the credit used from 1920 to 1925 came from non-resident individuals.

Compared with the experience in Newton, however, non-resident individuals have been a much more significant source of credit. For the entire period

over 27% of the land credit came from this source as compared with 3.2% for Newton. One explanation of this difference is that many Walnut Grove landowners lived outside the township at the time of the transfer of the land. Many of the retiring farmers particularly moved to Galesburg, the county seat, which is only five miles away from the boundaries of the township. The residence of landlords outside the township, which was noted in another connection, likewise serves as an indication of the same situation. Under a condition of tenancy the transfer of land does not take place as soon as the owner-operator retires but only after a period of renting during which time the owner has had the opportunity to take up his residence in

CHART I

AMOUNTS LOANED AND PERCENTAGE DISTRIBUTION AMONG SOURCES OF MORTGAGE LOANS IN THE TOWNSHIP OF WALNUT GROVE, KNOX COUNTY, ILLINOIS: 1850-1925

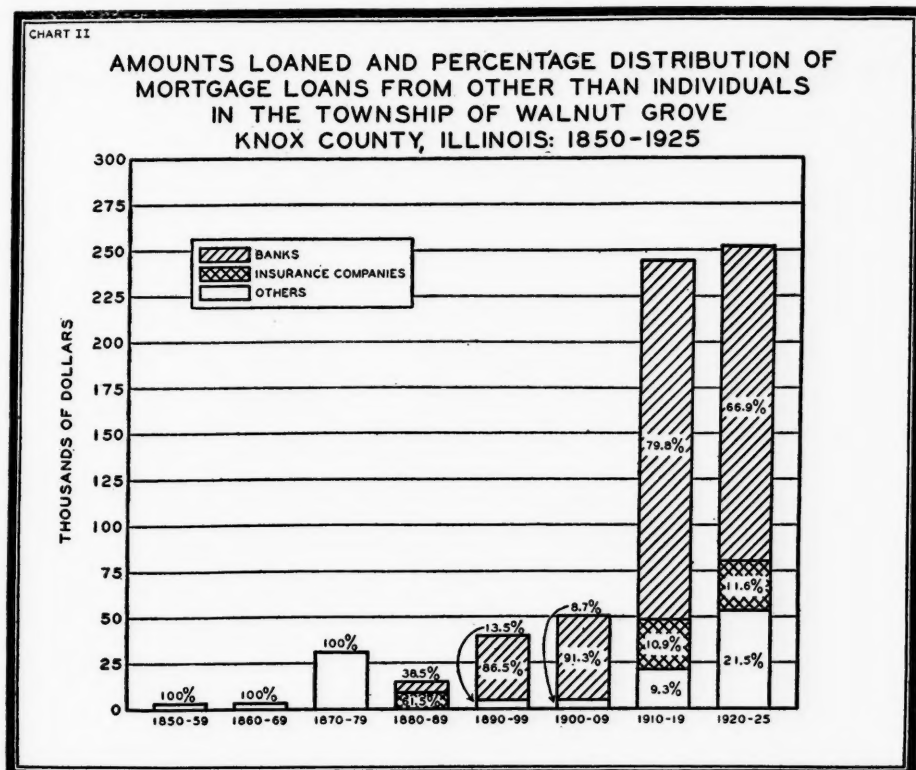


neighboring towns or elsewhere. Where sales take place without a period of renting, the mortgagee will usually be listed as a resident of the town, though he may become a non-resident very soon afterward.

Institutions as a source of credit came into prominence in Walnut Grove about the same time as in Newton, after 1910, and especially in the post-war period. Throughout the whole period from 1850 to 1925 they furnished 29 1/2% of the total mortgage money but from 1910 to 1920 almost 65% came from this source and after 1920, over 85%. This is not only unusually high in comparison with the other sources, but is higher than in Newton or in Iowa, where 50% originated in this manner from 1915 to 1925.¹

Analyzing the institutions into insurance companies, banks and others, it is found that in the first 30 years neither banks nor insurance companies made any loans at all. However, in the the next decade (1880-1890) they were the exclusive sources of "institutional" loans, the banks supplying 38.5% and the insurance companies 61.5%. The latter did not furnish any funds after that until 1910 but the banks stayed in the field, gradually increasing their lead, and after 1910 they furnished over 80% of this type credit. This is a result largely of the organization of the Federal Farm Loan system.

¹ W. G. Murray and F. L. Garlock, "Farm Mortgage Debt in Iowa," Iowa Experiment Station, *Current Economic Report* No. 6.



The Mortgage Rate of Interest

The mortgage rate as revealed by the recorded mortgages is shown in Table I for both townships. It will be noted that the interest rates have been higher for Walnut Grove than for Newton, with the exception of the decade from 1850-1859. A curious thing is that in both townships interest rates went up after 1870 as compared with the preceding Civil War decade. It would be interesting to know whether this situation existed throughout the Middle West, for the fact that it was discovered in two fairly widely separated communities

TABLE I. AVERAGE RATE OF INTEREST ON MORTGAGE LOANS, WALNUT GROVE AND NEWTON TOWNSHIPS, 1850-1925

Years	Walnut Grove	Newton
1850-59.....	8.53%	10.8%
1860-69.....	9.11	7.85
1870-79.....	9.66	8.09
1880-89.....	7.17	6.34
1890-99.....	6.22	5.32
1900-09.....	5.32	4.31
1910-19.....	5.64	4.57
1920-25.....	5.97	5.38

points in this direction. It seems to have resulted from a great demand for loanable funds, because in the decade from 1870 to 1879 the number of mortgage loans contracted was larger than for any other decade in both Newton and Walnut Grove.²

Length of Time for Which Mortgages Were in Force

As explained in connection with the former credit study, the length of time between the giving of the mortgage and its satisfaction is not an indication of the duration of the mortgage encumbrance of a farm. Not until renewals and transfers of mortgages from one

mortgagee to another are carefully studied will this become apparent. Nevertheless, the figures are of some significance.

TABLE II. AVERAGE DURATION OF MORTGAGES IN WALNUT GROVE TOWNSHIP, ILLINOIS, 1850-1914

YEARS OF CONTRACTION	AVERAGE DURATION	
	Years	Months
1852-1854.....	4	4
1855-1859.....	5	4
1860-1864.....	4	8
1865-1869.....	4	8
1870-1874.....	4	2
1875-1879.....	4	4
1880-1884.....	5	6
1885-1889.....	5	5
1890-1894.....	5	5
1895-1899.....	6	2
1900-1904.....	4	5
1905-1909.....	3	11
1910-1914.....	3	9
Average Duration for Entire Period.....	4	10

The average duration of mortgages by 5-year periods in Walnut Grove can be seen in Table II. Data showing when the mortgage was satisfied were not given in 11% of the cases, a percentage not large enough to impair the accuracy of the figures. The average duration of the encumbrance for the entire period was 4 years and 10 months, which was

² The United States Census made a study of real estate mortgages (both farm and urban real estate) for the period 1880-1889 which was published as *Report on Real Estate Mortgages in the United States at the Eleventh Census: 1890* by George K. Holmes and John S. Lord, Special Agents (1895). These data were obtained from the county records as in the present study.

Interest rates were reported by states and by certain selected counties for every year from 1880 to 1889 and averaged for the 10-year period. Some of the figures are as follows:

Average Rate by Years	Illinois	Wisconsin	Milwaukee County
1880.....	7.35%	7.67%	6.80%
1885.....	7.16	6.96	6.39
1889.....	6.70	6.75	6.19
10-Year Average.....	7.02	6.98	6.32

about 6 months less than in Newton. No consistent regularity appears in the figures from one quinquennium to another, the highest being 6 years and 2 months for 1895-1899, and the lowest being 3 years and 9 months for 1910-1914. The last figure is low because a large number of mortgages given during that period were still in force at the time of the investigation and the average represents only those actually matured.

Annual Mortgage Encumbrance

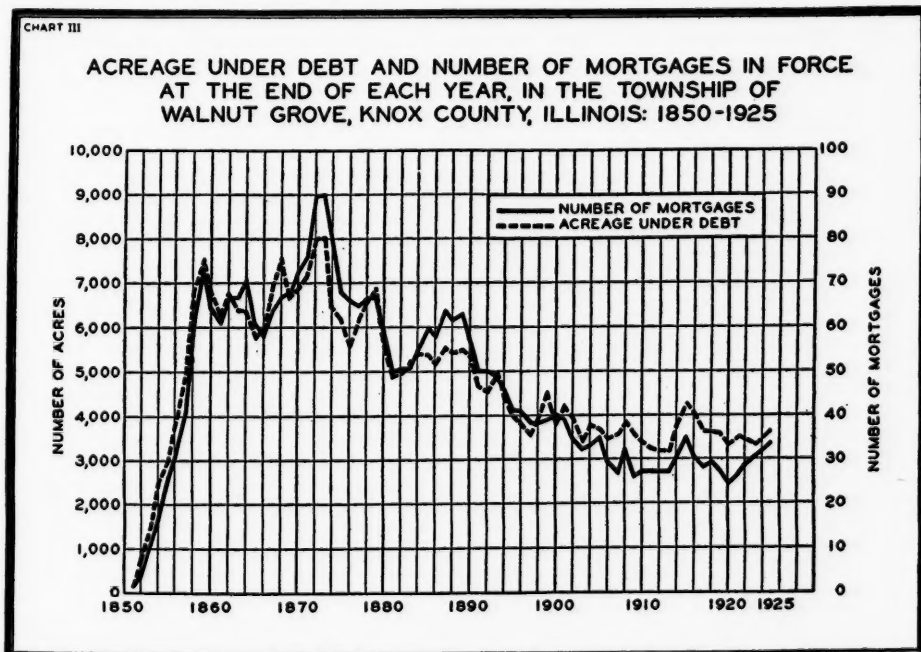
We are now ready to consider the number of mortgages, the acreage mortgaged, and the value of the mortgages by years. Table III shows these data for the 27 sections of this township. The number of mortgages given per decade rose until it attained the highest figure in the decade of the '70's and then began to decline. It is interesting to compare these figures with those for Newton.

In both townships the largest number of mortgages was contracted in the same decade, and the change in numbers follows the same course, even to a slight increase from 1910-1919.

TABLE III. ANNUAL MORTGAGE ENCUMBRANCE IN WALNUT GROVE TOWNSHIP, ILLINOIS, 1850-1925

Years	Number of Mortgages per Decade	Average Acreage Mortgaged Each Year	Average Amount Borrowed per Annum
1850-1859	103	1,421	\$10,184
1860-1869	140	1,628	24,672
1870-1879	154	1,865	39,857
1880-1889	103	1,116	23,363
1890-1899	68	900	24,266
1900-1909	62	735	26,779
1910-1919	66	814	37,742
1920-1925	30	340	29,330

The average acreage mortgaged each year correlates with the number of mortgages very consistently in Walnut Grove but in Newton it does not. Because of the change in land values,



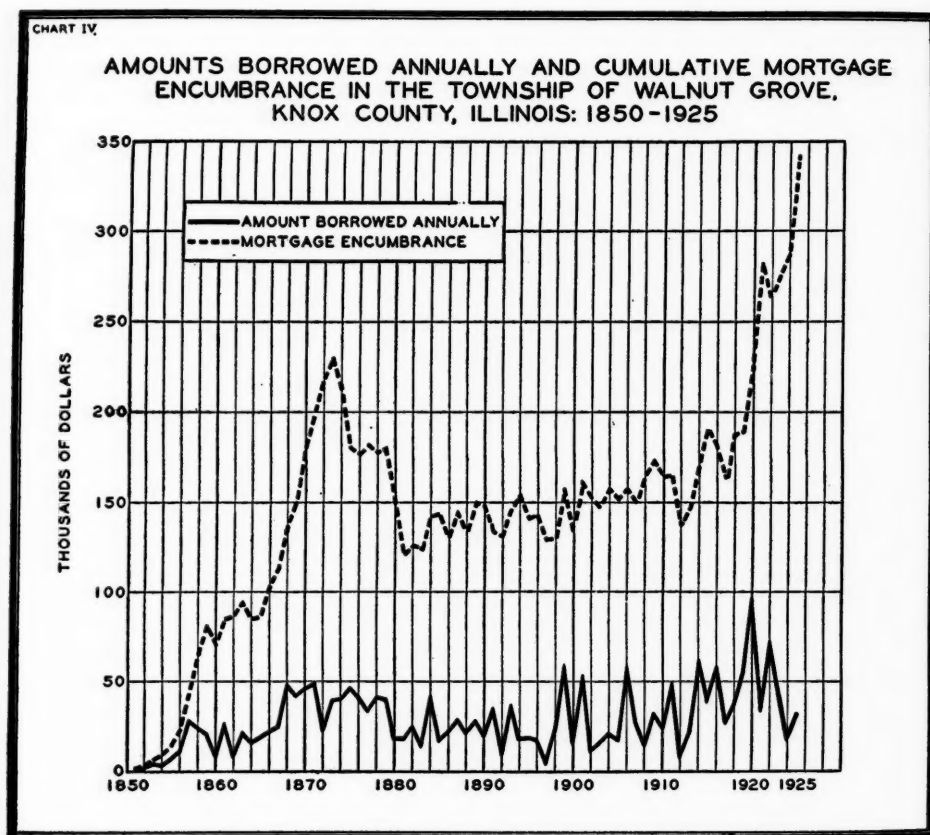
the average amount borrowed per annum naturally did not move in the same direction as the number of mortgages or the acreage mortgaged. However, in Walnut Grove Township the decade having the highest number of mortgages also had the largest amount borrowed.

Cumulative Mortgage Encumbrance

The number of active mortgages on the farms of Walnut Grove Township and the total acreage under debt at the end of each year are shown on Chart III. It will be noted that the number of mortgages rose steadily, though not consistently, until 1872-1873 and then

fell, reaching the lowest point in 1920. The acreage under mortgage followed the number of mortgages in force fairly consistently.

Newton, on the other hand, reached the peak a few years later than Walnut Grove but did not have a sharp decline in the number of mortgages in force each year. The acreage under debt in Walnut Grove continued to rise until 1895, then declined, but reached another peak in 1916. As was pointed out in the former article, after 1880 Newton reached a fairly stationary point in the number of mortgages given and satisfied, and the acreage mortgaged. This is more evident when the figures are presented by



census years as in Table IV, instead of annually.

TABLE IV. PERCENTAGE OF LAND MORTGAGED IN WALNUT GROVE, NEWTON, STATE OF ILLINOIS, AND THE UNITED STATES, BY CENSUS YEARS, 1850-1925

YEAR	PERCENTAGE OF LAND AREA MORTGAGED			
	Walnut Grove*	Newton*	Illinois†	United States†
1850..		5.08		
1860..	40.29	31.58		
1870..	40.97	34.64		
1880..	33.70	49.73		
1890..	31.69	51.56	36.7	28.2
1900..	22.37	51.62	39.3	31.1
1910..	20.30	52.76	39.1	33.6
1920..	19.60	52.28	42.6	41.3
1925..	21.92	50.01	36.5	35.9

* Percentage of acreage.
† Percentage of owned farms.

The contrast between the two areas is easily seen in this table. Compared with the almost stationary figure for Newton, Walnut Grove shows a decline since 1870. For Illinois and the United States, on the other hand, the percentage of owned farms that were mortgaged increased since 1890. However, the two sets of figures are not quite comparable because the census figures include only owned farms, whereas the Walnut Grove and Newton data refer to all land regardless of the kind of tenure.

The curves showing the amount borrowed annually and the cumulative mortgage encumbrance in Walnut Grove are rather different from those for Newton. In the Wisconsin township there was a fairly consistent increase in the total mortgage load until 1919; thereafter a slight decrease occurred. In Walnut Grove a peak was reached in 1873 followed by a decline until 1881. Not until 1917 was there another important rise, but from that year the mortgage indebtedness rose exceedingly rapidly.

These facts are emphasized in Table V which shows the increase and decrease

of debt by census years. It is noticeable that for three decades mortgage encumbrance actually decreased over preceding census years, but for the last 30 years the decennial change was reversed. The increase in indebtedness in the post-war period is in part explained by the fact that the Federal Farm Loan system made money easily available. Of the \$544,000 borrowed on mortgages during the six years, \$167,000 came from banks, largely the Farm Land

TABLE V. CHANGES IN MORTGAGE ENCUMBRANCE OF WALNUT GROVE TOWNSHIP, BY CENSUS YEARS, 1850-1925

Year	Mortgage Debt	Increase or Decrease over Preceding Census Year	Percentage of Increase or Decrease
1850.....			
1860.....	\$ 69,956	\$ 69,956	100.00%
1870.....	179,167	109,211	156.11
1880.....	153,158	-26,009	-14.52
1890.....	147,549	-5,609	-3.66
1900.....	134,056	-13,493	-9.14
1910.....	162,967	28,911	21.57
1920.....	225,400	62,433	38.31
1925.....	339,250	113,850	50.51

Banks. In a number of cases private mortgages were paid off and loans obtained from this new source of credit.

Growth of Tenancy and Mortgage Indebtedness

The persistence of mortgaged land in Newton and the decline of mortgages in Walnut Grove correlates inversely with the percentage of tenancy in the two areas. Table VI presents the figures. Tenancy in Manitowoc County increased from 1.9% to 4.1% during the last 45 years, whereas the increase in Knox County was from 28.8% to 46.4% during the same period. The percentage of land under mortgage in Newton fluctuated around 50%, while the acreage mortgaged in Walnut Grove decreased from 33.7% to 21.9%.

TABLE VI. PERCENTAGE OF TENANCY IN WISCONSIN, MANITOWOC COUNTY, ILLINOIS AND KNOX COUNTY, AND PERCENTAGE OF LAND MORTGAGED IN NEWTON AND WALNUT GROVE, BY CENSUS YEARS, 1880-1925.

YEAR	PERCENTAGE OF TENANCY				PERCENTAGE OF LAND AREA MORTGAGED	
	Wisconsin	Manitowoc County	Illinois	Knox County	Newton	Walnut Grove
1880.....	9.1%	1.9%	31.4%	28.8%	49.7%	33.7%
1890.....	11.4	2.3	34.0	34.3	51.6	31.7
1900.....	13.5	3.8	39.3	40.7	51.6	22.4
1910.....	13.9	3.6	41.4	45.2	52.8	20.3
1920.....	14.4	4.3	42.7	46.1	52.3	19.6
1925.....	15.5	4.1	42.0	46.4	50.0	21.9

The results of this study substantiate the thesis set forth in the former article that the farmer may climb the "agricultural ladder" by two methods. He may remain a tenant for a long time and accumulate money sufficient to buy a farm outright. This means a large percentage of tenancy but a very small number of mortgaged farms. On the other hand, he may purchase his farm outright giving a mortgage for the unpaid sum. This would mean a high percentage of encumbered farms but very few tenants. However, neither of the two methods is used to the exclusion of the other nor is the mortgage used only for the purchase of land. Money is sometimes borrowed for other purposes.³

³ It is interesting to note that the special investigation into real estate mortgages made by the Census of 1890 included an inquiry into the purposes of the mortgage debt. Over 54% of the mortgages on farm and city real estate were for "purchase money" and about 21% for improvements. Over 80% of such mortgages were for these two purposes or for a combination of the two. See *supra*, n. 2, *op. cit.* p. 278.

Summary

Comparing Newton which has few or no tenants with Walnut Grove which is in an area with 46% tenancy, we find that the former township reached its so-called "normal percentage" (50%) of land area mortgaged in 1880 and has not changed materially since then. Walnut Grove, however, has decreased its area under mortgage encumbrance since 1870 but has increased its percentage of tenant farms. Fewer mortgages have been given in the Illinois township. On the other hand, the mortgage rates have been higher than in Newton, with the exception of the decade from 1850 through 1860. In the former, credit has been more of the commercial type; less money has come from local residents and more from non-resident lenders and from banks than in Newton. Finally, the average duration of mortgages is somewhat less in the Illinois community.

DEPARTMENTS

The departments of the JOURNAL are edited specifically with regard to their interest to the readers who are especially concerned with the economic problems of land and public utilities. For the most part the material for the departments will be prepared by members of the staff of the Institute for Research in Land Economics and Public Utilities.

SUMMARIES OF RESEARCH

In this department are given brief accounts of investigations in progress and statements of tentative conclusions reached in the course of work by the staff of the Institute and others associated with the Institute's work.

- Some Economic Aspects of the 1927 Tax Burden
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COMMENTS ON LEGISLATION AND COURT DECISIONS

Here the readers of the JOURNAL will find a miscellany of summaries and interpretations of recent legislation, court decisions, and documents that have economic significance in land and public utility problems.

- National Courts and Local Utilities
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SUMMARIES OF RESEARCH

SOME ECONOMIC ASPECTS OF THE 1927 TAX BURDEN ON CHICAGO'S STREET CAR PATRONS

URBAN transportation is so vitally important to every one living in large metropolitan areas that, whenever it fails to be self-supporting, taxes are levied or other arrangements are made by the political unit to keep the wheels turning. Cheap, rapid, and adequate transportation service is beneficial not only to those who actually purchase transportation but to every one in the community. It enables the population to spread over a wider area, thus, improving general living conditions;¹ it enhances land values in suburban sections and in the central business district by furnishing easy communication for trade and business purposes;² it makes resi-

dence in desired localities possible regardless of the place of business;³ it renders standby service for those who use private means of transportation or use the service only under exceptional conditions;⁴ it makes for more efficient mass transportation by attracting a large number of individuals who otherwise would use private vehicles;⁵ and it multiplies the possibilities of social contacts by providing a method for relatives and friends to reach one's door without undue inconvenience and expense.⁶ Yet despite these services to the entire community,⁷ the patrons alone bear the cost

part of the cost of a subway because they regard such service to the public as good business policy.

³ Good neighbors are an asset to all residents in a given locality. If good transportation enables the established residents to remain, it serves an individual's neighbors as well as himself.

⁴ In case of need, this standby service may be exceedingly valuable. If one's car fails or an emergency exists it may be necessary to undergo considerable expense to communicate with desired localities. This item may be evaluated by taking the difference between the taxi fare and the street car fare plus the effort to secure a taxi and multiplying that sum by the number of possible emergencies in the year.

⁵ A private automobile carrying one or two passengers requires road space capable of accommodating about 20 street car passengers. If even a small percentage of those who now ride were to use private vehicles they would multiply their needs by 20, slowing up traffic through congestion, increasing accidents, and possibly even necessitating the construction of additional roads with the accompanying cost.

⁶ Social contacts are considered desirable, and in order to maintain them one will normally be willing to assess himself a small sum annually for the purpose.

⁷ It is very difficult to estimate in toto the value of these services per individual inhabitant, since this varies greatly, depending on the individual land holdings, interests, etc. If the value of these services is estimated at \$8.72 per year per person, one million individuals would absorb the entire tax burden of the Chicago Surface Lines, while for \$16.00 they could assume, on a 6% basis, not only the tax burden but the return to capital invested as well, making it possible to furnish the present service on the basis of a 5-cent fare.

(Continued on page 315)

¹ The differential between living near to and at a distance from one's work consists of the cost measured in terms of monetary outlays, time and inconvenience of transporting oneself to the desired locality. This cost must be offset by the economic (reduction of rent) and psychic (more elbow room) returns. If the differential is reduced, then certain individuals will be able to move to suburban districts, and thus, under the assumption of a stationary population, benefit not only themselves but those who must remain by reducing congestion in the old districts. This movement will reduce temporarily the average rent paid for a given area of ground and encourage growth in population, at least as far as the particular city is concerned, with a corresponding increase in business.

² Since people can now economically live in suburban areas, lots in these districts enter a higher and more intensive use with a corresponding increase in value. On the other hand, business men find it profitable to provide facilities which enable more customers to reach their stores. If called upon to make their contributions, these individuals could pay up to the amount of the gains derived in this manner. These gains are exceedingly large although very hard to measure. Some indication of their worth, however, may be gathered from the fact that in many cases subdividers are willing to shoulder the entire burden of constructing transportation utilities and business men furnish garage and hostler service for automobiles when "no parking" ordinances are enforced in the downtown district. Furthermore, property owners in Chicago's loop have indicated their willingness to assess themselves for a substantial

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of transportation and make, in addition, a material contribution to meet the cost of government.

From the standpoint of the utility and its patrons the aforementioned services may be classified as indirect, since in themselves they create no additional expense and exist merely because the company is organized and doing business in the particular community. Other services, however, which the utility may be required to render directly to the community require financial outlays on the part of the street car riders. In addition to the annual contribution in the form of direct taxes, such expenditures consist of furnishing paving for those who use the center of the streets; paying a part of the general street cleaning expense as well as keeping their own route open; bearing the cost incident to filling and repairing excavations made across their tracks by the municipality; and supplying free transportation to those engaged in furnishing police and fire protection to the community.

In this connection the 1927 tax bill for the Chicago Surface Lines, analyzed in terms of revenue passengers, makes a very interesting study. During this period the Company transported 876,249,663 revenue passengers at the average fare of 6.897 cents per ride. The total tax bill which these riders were called upon to pay amounted to \$8,261,155.48 or .009426 cents (approximately one cent) per revenue passenger. This bill is itemized in Table I.

From these figures we conclude that, if the non-users who receive benefits without paying their proportionate share

(Footnote 7 continued from page 314)

If this tax and capital burden were distributed in this fashion, it would doubtless bring about a more economical utilization of the plant and enable the transportation utilities better to serve their social purpose. A lower fare would encourage additional riding, especially during off-peak periods, bringing about a better use of the capital equipment and plant overhead.

of the costs were by some equitable method to lift the tax burden from the revenue passengers, the fare could be reduced to six cents or, if the present fare were continued, the sum paid in taxes would, at 8%, support an additional investment of \$103,264,443.50⁸ for improving and extending the service.

Taxes, therefore, consume approximately 15% of the present gross revenues of the Chicago Surface Lines. The

TABLE I. ANALYSIS OF THE 1927 TAX BILL OF THE CHICAGO SURFACE LINES IN TERMS OF REVENUE PASSENGERS

Type of Tax	Amount	Cents per Revenue Passenger
General.....	\$3,630,929.91 (a)	.004143
Free Riders.....	650,000.00 (b)	.001255
Paving.....	1,000,000.00 (c)	.001141
Street Cleaning.....	360,000.00 (d)	.000410
City's Share of Surplus Earnings.....	2,620,325.57 (e)	.002991
	\$8,261,155.48	.009426

(a) Includes all of the general taxes as reported by the Company.

(b) Free rides to police and firemen are estimated by the Company as approximately 1/4 of the total free rides and are checked for reasonableness by figuring two rides per day per city employee in this class.

(c) Paving cost is estimated from the reports of the Company in conference with an engineer with considerable experience in estimating track construction cost and includes all expenses of this nature such as filling excavations made by the city, etc.

(d) Street cleaning item is a flat payment to the city in addition to the Company's own cost of keeping its tracks clear.

(e) After 5% is allowed on the agreed value of the property, the city and Company share the balance on the basis of 55% to the city, and 45% to the Company according to the operating agreement of 1913.

entire cost of the service is borne by the utility patrons, who in many cases are paying close to what the traffic will bear, although many others derive benefits from the service. In equity, as far as public utilities are concerned, such costs should be shared according to the benefit derived from the service, and the problem of urban transportation will not be

⁸ This sum is approximately equal to 3/4 of the present agreed valuation of the properties of the Chicago Surface Lines which is \$163,745,856.06.

solved until some recognition of these political authorities and the general other factors is made on the part of the public.⁹

L. D. JENNINGS.

⁹ The desirability of "painless extraction" of taxes (as \$6.00 per year from regular patrons of the Surface Lines without their knowledge and reflecting entirely on the Company and not on the political party in power) is a political question of merit which has not been considered. The public pays more easily this way

even though it comes higher, but when this charge approaches what the traffic will bear and results in strenuous objection on the part of the patrons, the economic aspects of the question are properly opened for consideration.

PUBLIC UTILITY FINANCING DURING THE FIRST QUARTER, 1928

THE phenomenal volume of public utility financing recorded in the final month and the fourth quarter of 1927 was followed by a sharp contraction in January of this year, when the monthly index number stood at 176 (Table I) as compared with 433 in December and with 259 for January, 1927. The total in dollars was \$210,155,000 which is about one third less than the total of \$309,084,425 for the first month in the

preceding year; and is less by \$307,257,000 than the high December total.

In relation to the market as a whole, public utility issues constituted 27.1% of the grand total of all financing in the first quarter and 36.2% of all corporate financing. In 1927 the first quarter volume was 34.7% of the grand total and 46.1% of the corporate total.

The entire first quarter of 1928 was, in fact, well below the level of the fourth

TABLE I. INDEX NUMBER OF VOLUME OF PUBLIC UTILITY FINANCING*
1919-1928

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
By Months										
January.....	100	67	55	46	122	112	199	173	259	176
February.....	48	28	25	47	66	89	172	125	314	220
March.....	25	27	25	43	94	78	144	115	158	190
April.....	5	38	25	50	64	112	69	182	165	318
May.....	15	38	35	150	66	233	103	230	214	203
June.....	26	20	9	96	92	122	118	181	130	.....
July.....	41	25	115	44	21	104	90	177	97	.....
August.....	20	11	33	22	40	62	93	58	92	.....
September.....	54	44	34	147	34	77	110	38	168	.....
October.....	24	33	33	77	59	112	92	123	261	.....
November.....	8	21	119	43	161	69	102	136	212	.....
December.....	20	63	53	54	135	111	153	114	433	.....
By Quarters										
1st Quarter.....	100	71	61	80	164	162	299	240	424	340
2nd Quarter.....	27	56	41	172	129	271	168	344	295	.....
3rd Quarter.....	67	47	105	123	55	141	170	159	207	.....
4th Quarter.....	30	68	119	101	206	169	201	217	528	.....
By Years	100	107	145	212	246	330	373	427	647	.....

*Volume for January, 1919, First Quarter, 1919, and Year 1919 used as basis for computing index numbers for months, quarters, and years respectively. Compiled from the monthly record of new capital flotations of the *Commercial and Financial Chronicle*.

TABLE II. WEIGHTED AND SIMPLE AVERAGE YIELD AT OFFERING PRICE OF NEW PUBLIC UTILITY SECURITY ISSUES

YEAR	ALL TYPES OF SECURITIES						BONDS AND NOTES	
	All Maturities		Long-Term		Short-Term			
	Weighted Average Yield	Simple Average Yield	Weighted Average Yield	Simple Average Yield	Weighted Average Yield	Simple Average Yield	Weighted Average Yield	Simple Average Yield
1919.....	6.55	6.68	6.21	6.25	6.78	7.03	6.54	6.67
1920.....	7.55	7.64	7.52	7.59	7.59	7.68	7.53	7.62
1921.....	7.13	7.47	7.11	7.42	7.27	7.66	7.11	7.45
1922.....	6.06	6.34	6.03	6.32	6.39	6.53	6.03	6.34
1923.....	6.04	6.31	5.99	6.26	6.73	6.72	6.11	6.29
1924.....	6.03	6.14	6.04	6.16	5.97	6.04	5.98	6.12
1925.....	5.58	5.81	5.66	5.83	5.55	5.86	5.56	5.78
1926.....	5.53	5.72	5.52	5.70	5.77	5.82	5.44	5.66
1927.....	5.24	5.61	5.25	5.57	5.11	5.77	5.12	5.57
1928								
1st Quarter.....	5.09	5.52	5.08	5.45	5.52	5.94	5.14	5.49
2nd Quarter.....								
3rd Quarter.....								
4th Quarter.....								

quarter of 1927, but the big swing upward in April of this year makes the five months' total of 1928 only \$1,665,240 less than the total for the first five months of 1927. In April, 1928 the recorded volume of public utility financing was larger than for any preceding month, except December, 1927, in a 10-year period.

A feature of this changing volume is the increased amount of capital sought by railway and electric companies as distinguished from light and power companies. For the first quarter the former group of utilities offered 20.7% of the total, as compared with 9.1% for the entire year 1927 and 3.8% for the year 1926; gas and electric companies

offered 24.2% and electric companies offered 17.6%. The gas group in this quarter maintained the ratio of 1927, offering 12.8% of the total volume.

These changes in volume totals were accompanied by somewhat lower yields (Table II). The average return on all securities was 5.09% on the dollar and 5.52% on the issue for the first quarter. These yields compare with 5.04% on the dollar and 5.50% on the issue in the fourth quarter, and 5.43% on the dollar and 5.71% on the issue in the first quarter of 1927. Bond yields rose to 5.14% on the dollar and 5.49% on the issue in the first quarter of 1928, compared with 4.94% on the dollar and 5.46% on the issue in the last quarter of 1927.

PETER LEININGER

COMMENTS ON LEGISLATION AND COURT DECISIONS

NATIONAL COURTS AND LOCAL UTILITIES

IN recent years it has come to be the practice of purely local public utilities to test the validity of state or municipal regulation not in the state courts but by an immediate resort to the federal courts. Let us suppose that a state commission has entered an order fixing the rates of a water company; or that a municipality has passed an ordinance imposing upon a street railway a duty to repave its track zone. To prevent enforcement of such requirements, deemed unreasonable by the companies, the normal recourse would be an appeal to the state courts, under well-defined procedure explicitly prescribed by statute.¹ In the place of such appeal, however, the utilities are more and more frequently filing their bills in equity in the federal district courts, asking for injunctions against the state or city officials, upon the ground that the regulation threatens to confiscate their property contrary to the 14th Amendment to the Federal Constitution. Where such confiscation is alleged the federal courts clearly have jurisdiction even though the case, in all its other aspects,

involves purely local questions or the interpretation of state statutes or decisions.² In the earlier cases jurisdiction of the federal courts was usually rested upon a claimed "diversity of citizenship," existing between the parties in litigation—frequently a diversity of form and not of substance.³

This practice of ignoring the state tribunals was given a temporary setback by the famous *Prentis* case, in which the Supreme Court held that an application to a federal court was premature where an appeal had not been taken to the state supreme court.⁴ But a series of subsequent decisions has well nigh reduced the *Prentis* doctrine to impotence. There are now indeed few situations where no diversity of citizenship exists but a federal constitutional question is raised, in which it is not now proper to appeal directly to a federal court, ignoring the state courts.⁵ And such action apparently has been taken, before a state commission has finally disposed of a case pending before it.⁶

This practice has aroused not a little resentment among state officials and

¹ See, e. g. Pa. Stat. 1920, Sec. 18178 et seq.; Wisconsin Stats. 1927, Sec. 196.41 et seq.; Illinois R. S. (Cahill) Chap. 111a Sec. 87.

² *Willcox v. Consolidated Gas Co.* 212 U. S. 19 (1909); *Phoenix R. R. Co. v. Geary*, 239 U. S. 277, 278 (1915); *Ex parte Young*, 209 U. S. 123, 144 (1908); *Minnesota Rate Cases*, 230 U. S. 352, 380 (1913); *Siler v. Louisville & N. R. Co.* 213 U. S. 175, 190 (1909); *Louisville & N. R. Co. v. Garrett*, 231 U. S. 298 (1913). Cf. *Owensboro Waterworks Co. v. Owensboro*, 200 U. S. 38 (1906).

³ In a recent case in the United States Supreme Court which has aroused much comment, and in which a vigorous dissent was written, it appeared that a Kentucky corporation transferred its assets to a Tennessee corporation having the same name and shareholders so that it might sue its competitors in a Kentucky

federal court, rather than in the state courts. *Black & White Taxicab and Transfer Co. v. Brown and Yellow Taxicab and Transfer Co.*, 48 Sup. Ct. 404 (1928).

⁴ *Prentis v. Atlantic Coast Line Co.* 211 U. S. 210 (1908).

⁵ See e. g. *Bacon v. Rutland R. R. Co.*, 232 U. S. 134 (1914); *Oklahoma Natural Gas Co. v. Russell*, 261 U. S. 290 (1923); *Pacific Tel. & Tel. Co. v. Kuykendall*, 265 U. S. 196 (1924); *Railroad and Warehouse Commission v. Duluth Street Ry. Co.* 273 U. S. 625 (1927); *Banton v. Belt Line Ry.*, 268 U. S. 413 (1925).

⁶ *Smith v. Illinois Bell Tel. Co.*, 270 U. S. 587 (1926), where the federal injunction issued while the case was pending before the Commission, where it had been reposing for an unreasonable time; *Prendergast v. New York Tel. Co.*, 262 U. S. 43 (1923), where no application

(Continued on page 319)

public bodies⁷ and a few attempts have been made by Congress to place limitations upon this practice. Perhaps the most important was the requirement that all petitions for injunctions should be heard by a court of three federal judges, instead of by the district judge sitting alone.⁸ Another amendment to the same section of the Judicial Code provided that proceedings in the federal courts in such cases must be stayed if it appeared that proceedings in the state courts had been begun to enforce the state order attacked. A recent study has

disclosed that this procedure has not been employed in a single case.⁹

The latest effort to limit the federal courts in local utility cases (a bill motivated in some degree by the *Interborough* case¹⁰) is far more drastic. By a bill introduced May 3, 1928, Senator Wagner of New York proposed to deny to the federal district courts jurisdiction

by the last session of the Indiana Legislature (March 11, 1927), reading in part as follows:

* * *

Whereas, Certain utilities of this state, to wit: The Indianapolis Water Company, the Indiana Bell Telephone Company, the Citizens Gas Company, of Indianapolis, and the Central States Gas Company, of Vincennes, and the Greensburg Water Company, of Greensburg, petitioned the Public Service Commission of the State of Indiana for increased rates for service to the public; and,

Whereas, Such petitions were heard and valuations thereof determined and rates fixed by the Indiana Public Service Commission, which were in the judgment of the Commission, fair, reasonable and just; and,

Whereas, Said utilities, to wit: The Indianapolis Water Company, the Indiana Bell Telephone Company, the Citizens Gas Company, the Central States Gas Company, of Vincennes, and the Greensburg Water Company did, immediately in each case, invoke the jurisdiction of the federal court of the State of Indiana instead of taking their cases to our state courts, alleging that the valuation determined and rates fixed by the Public Service Commission were confiscatory; and,

Whereas, The laws of the State of Indiana governing the Public Service Commission, provide for and authorize any utility or person interested in any rate order, to appeal to the circuit court or superior court of any county in this state from any order of the commission, fixing such rate or rates, or valuation; and,

Whereas, Such utilities did, in each instance, invoke the jurisdiction of the federal court without first having pursued the remedy provided by the laws of the State of Indiana giving the right to appeal to the state courts; and,

Whereas, In each instance the federal court has fixed a higher valuation and a higher rate than that fixed by the Public Service Commission; and,

Whereas, The right of the State of Indiana to control its local affairs with reference to such utilities was defeated and prevented; and,

Whereas, The Public Service Commission of Indiana fixed the valuation of the Indianapolis Water Company at \$16,455,000; the Indiana Bell Telephone Company at \$32,000,000; the Citizens Gas Company at \$12,000,000; the Central States Gas Company, of Vincennes, at \$482,845, and the Greensburg Water Company at \$225,000; and,

Whereas, Thereafter at hearings in the federal court of the district of Indiana, the valuations of these public utilities were fixed at the following figures, to wit: The Indianapolis Water Company at \$19,000,000, resulting in increase of rates; Indiana Bell Telephone Company at \$36,000,000, resulting in increase of rates; Citizens Gas Company at \$16,000,000, increasing the rate of gas from ninety (90) cents to one dollar and twenty cents (\$1.20); Central States Gas Company, of Vincennes, at \$739,572; and the Greensburg Water Company at \$340,000, resulting in increase of rates; therefore,

Be it resolved by the seventy-fifth general assembly of the State of Indiana, That the United States senators and members of congress, representing the State of Indiana, be, and they are hereby respectfully petitioned to prepare, support and (with) their associates enact legislation limiting the jurisdiction of the courts of the United States in all cases that may be filed therein by public utilities seeking relief from orders issued by public service commissions, to such utilities as have first exhausted all legal remedies given by the court of the respective states.

⁸ Section 266 of the Judicial Code, 28 U. S. C. A. 380.

⁹ Welch Pogue, "State Determination of State Law and the Judicial Code", 41 *Harvard Law Review* 623, 628(1928) note 20.

¹⁰ See note 7, *supra*.

(Footnote 6 continued from page 318)

for a rehearing or modification of the Commission's order was made by the company before the federal injunction was sought.

⁷ This criticism probably reached its height, for volume and intensity at least, as a result of the recent proceedings in the New York Rapid Transit case. Attorneys for the company and for the city and state engaged in a race to be the first to begin proceedings, on the one hand to prevent a departure from a five-cent fare, and on the other to prevent interference with the charging of such an increased rate. The company rushed with its bill to the federal court; the city to a state court. The company won by a hairsbreadth, and secured a sweeping injunction. *Interborough Rapid Transit Co. v. Gilchrist*, *New York Law Journal*, May 14, 1928. On May 21, 1928 the United States Supreme Court granted a stay of the court's order of injunction pending appeal to that court. The case is set for hearing for October 2, 1928. *New York v. Interborough Rapid Transit Co.*, 48 Sup. Ct. 636 (1928).

A similar situation arose earlier in Massachusetts when the Worcester Electric Light Company obtained an injunction in the federal district court (*Worcester Electric Light Co. v. Atwill*, 23 Fed. (2nd.) 891 (1928)) restraining the Department of Public Utilities from enforcing a reduction of rates (Report and Order, D. P. U. 2609 and 2694, June 3, 1927). This action by the Company prompted the Department to assail the "so-called United States Supreme Court doctrine" of valuation as follows: "This doctrine promotes greed and gluttony upon the part of the owners of public utilities" (Mass. House Documents, No. 169, Dec. 8, 1927); and to recommend legislation (Mass. House Documents, No. 170) substituting regulation of gas and electric companies by contract with the Commonwealth for the existing system. Previously the Department had also suggested "public operation" as "a means of escape" from the valuation doctrines of the United States Supreme Court (Mass. House Documents, No. 1150, March 14, 1927).

A typical expression of protest against the practice is to be found in a joint resolution (Chapter 269) passed

over suits brought by or against a public utility corporation, either because of the diversity of citizenship, or because a federal constitutional provision (other than the commerce clause) is involved.¹¹

A measure having a similar effect, and undoubtedly motivated in part at least by the same dissatisfaction, is one intro-

duced by Senator Norris of Nebraska, Chairman of the Judiciary Committee of the Senate, under which diversity of citizenship will no longer be a basis for federal jurisdiction.¹²

DAVID E. LILIENTHAL
IRWIN S. ROSENBAUM

¹¹ S. 4491, 70th Congress 1st Session. The bill was referred to the Committee on the Judiciary.

¹² See Henry J. Friendly, "The Historic Basis of Diversity Jurisdiction," 41 *Harvard Law Review* 483 (1928).

MUNICIPAL CONTROL OF AN OUTLYING LAND SUBDIVISION

THE method of controlling land subdivision outside municipal limits is a problem bothering many city plan commissions and zoning boards today. Instances of the need for such control are seen in the metropolitan regions and are found also in many rapidly growing independent cities. Much of the benefit of a careful zoning and planning program can be destroyed by a poorly coordinated subdivision which is outside the city limits at the time of its development. The work of the committee on the Standard City Planning Act has helped to focus the attention of students of both municipal government and urban land economics on this long-felt difficulty.

Of the several suggested methods of meeting the problem, that of granting city authorities control of adjacent subdivisions within a definite zone extending around the corporate limits received strong encouragement in the recent decision of the Supreme Court of Michigan in the case of *Ridgefield Land Co. v. City of Detroit et al.*¹ According to Act 279, Public Acts of 1909, amended in 1915, the charter of Detroit provides for the appointment of a city plan commission

of nine members with "power to pass upon the acceptance of all plats of land within and for a distance of three miles beyond the city limits." In 1925, Act 360 definitely extended this power in regard to street layout on a master plan by providing in Section I:

"The governing body (i. e.—the city council) shall determine as to whether said lands are suitable for platting purposes and shall have the right to require that all streets and private roads shall be graveled or cindered and properly drained and bridges and culverts installed where necessary, and where lots are platted of a width of 60 feet or less may require that concrete or gravel walks shall be built, and that all highways, streets and alleys conform to the general plan that may have been adopted by the governing body of the municipality for the width and location of highways, streets and alleys. . . . The governing body shall reject said plat if the same does not conform to the provisions of this Act."

On April 14, 1925, the council of Detroit adopted such a "general" or "master" plan of street layout which had been worked out by the city plan commission with the assistance of the road commissions of the counties of Wayne, Oakland and McComb. This master plan provided for certain super-highways of 204 feet in width, for major highways of 120

¹ 217 N. W. 58 (1928).

feet on the section lines, and for secondary thoroughfares 86 feet wide on quarter-section lines.

A plat of 80 acres, bounded on the north by Pembroke Avenue, an 86-foot street on the master plan, and on the east by Livernois Avenue, a major highway of 120 feet on the plan, was submitted by the Ridgfield Land Co. *Prior to the drawing of the master plan in 1925*, the city plan commission had accepted certain adjacent plats on Livernois and Pembroke Avenues, which did not observe the street widths determined in the plan but gave each a width of 66 feet. The plan commission, therefore, decided to compromise on the width of streets and to approve the Ridgfield plat tentatively on the following terms:

"1. A ten-foot building line is to be established on Pembroke Avenue to conform with property platted to the west.

2. Seventeen feet is to be dedicated for Livernois Avenue in addition to the regular thirty-foot dedication."

The Ridgfield Land Company refused to meet these conditions and began proceedings to compel the approval of their original plat. The Wayne County Circuit Court gave judgment against the plaintiff and the Supreme Court in upholding the decision said:

"The plaintiff concedes that in this respect (i. e. width of streets) its plat does not conform to the general street plan, but it contends that it does conform to the width of Pembroke and Livernois Avenues as dedicated in other plats, that the statute gives the city no power to require greater width as a condition to the approval of the plat, and that, if it can be interpreted as conferring such power, it is an infringement on the constitutional rights of the plaintiff, in that it compels the dedication of private property for public use without compensation therefor. There is no merit to this contention. The other plats referred to were approved and recorded before the present

general street plan was adopted; so it cannot be said that it was not made applicable alike to all persons."

The Court then described the requirement of increased width as reasonable in the change from the "horse and buggy age" to the present traffic conditions and turned to the detailed consideration of the plaintiff's contention that the requirement for additional dedication was, in fact, an exercise of the power of eminent domain.

"Its argument would have merit, and the authorities cited would have application, if this were a case where the plat had been recorded and the city were undertaking to widen the streets or to establish a building line. But this is not such a case. Here the city is not trying to compel a dedication. It cannot compel the plaintiff to subdivide its property or to dedicate any part of it for streets. It can, however, impose any reasonable condition which must be complied with before the subdivision is accepted for record. In theory at least the owner of a subdivision voluntarily dedicates sufficient land for streets in return for the advantage and privilege of having his plat recorded. Unless he does so, the law gives him no right to have it recorded."

In summing up the Court held:

"In the instant case the defendants have imposed two conditions with which the plaintiff is required to comply for the privilege of having its plat recorded. They are reasonable and necessary for the public welfare. In the exercise of its power under the statute and its charter, the city had a right to impose them. They do not constitute the taking of private property for public use and are not an infringement on plaintiff's rights . . ."

This definite pronouncement, concurred in by all justices taking part in the decision, on the two contentions usually urged against plat recording as a form of control cannot be ignored in comparing it with other forms of control.

The definite grants of extraterritorial power to the municipality seemed to

have precluded any argument on this point before the Supreme Court.

COLEMAN WOODBURY

THE CAMBRIDGE ZONING DECISION

THE decision of the United States Supreme Court in the case of *Nectow v. City of Cambridge, Massachusetts*¹ will not appear as a reversal of form to those who have read carefully the opinion in the *Euclid v. Ambler Realty Company* case.² That opinion indicated clearly in the following statement that the last word had not been said and could not be said on the basis of a single court case.

"In the realm of constitutional law, especially, this court has perceived the embarrassment which is likely to result from an attempt to formulate rules or decide questions beyond the necessities of the immediate issue. It has preferred to follow the method of a gradual approach to the general by a systematically guarded application and extension of constitutional principles to particular cases as they arise, rather than by out of hand attempts to establish general rules to which future cases must be fitted."³

In other words, the application of the police power through zoning must be tested in the light of the circumstances of particular cases and out of the examination of these specific instances will evolve a more or less general rule or principle with respect to comprehensive zoning. So the opposite decisions handed down in the *Euclid* and *Cambridge* cases are not surprising in spite of the general similarity of the facts.

The City of Cambridge, Massachusetts, passed a zoning ordinance dividing the city into three kinds of use districts:

residential, business and unrestricted. The property in question is an area of about 29,000 square feet which is part of a larger tract owned by the plaintiff. This 29,000 square feet, which is zoned as residential, is located on a corner and the property opposite it on both streets is also zoned for residence use but the balance of the tract is classed as unrestricted and borders on other lands also classed as unrestricted and occupied by factories and railroad tracks. The plaintiff stated that prior to the enactment of the zoning ordinance he had a contract for the sale of part of his entire tract for \$63,000, but after the passage of the ordinance the prospective purchaser rescinded the contract. Therefore, the plaintiff claimed that the ordinance in effect took his property without due process of law. Relief was denied the plaintiff in the Massachusetts court. But the Supreme Court reversed this decision. Basing its decision on the findings of the master, it held that the classification of the plaintiff's land for residential use was not justified because it would not yield adequate return on the investment and furthermore such classification did not promote the general welfare.

The general similarity existing between the *Euclid* and *Cambridge* cases is clear. Both involved comprehensive zoning ordinances against the enforcement of which an injunction was sought on the grounds that such enforcement constituted a violation of the Fourteenth Amendment to the Constitution. But there the similarity stops. The *Euclid*

¹ No. 509, U. S. Supreme Court; 72 L. ed.; 48 Sup. Ct. Rep. (Decided May 14, 1928).

² 272 U. S. 303 (1926).

³ *Ibid.*, at 315.

decision passed upon the reasonableness of comprehensive zoning as such. It was held to be a legitimate exercise of the police power to segregate land into use districts in the interest of the general welfare. In other words, the case hinged upon the reasonableness of the principle of comprehensive zoning.

The Cambridge case started where the Euclid case left off. The zoning ordinance of the City of Cambridge "in its general scope" was "conceded to be constitutional" within the Euclid decision. The issue in the later case was whether the action of the zoning authorities was unreasonable and arbitrary in a specific instance. Reasonableness in application was the crux of the problem.

Three points in the opinion as written by Justice Sutherland deserve special mention. In the first place, the value consideration had weight in the decision. From the point of view of the landowner it is reassuring to know that zoning classifications cannot arbitrarily or unreasonably reduce property values with impunity. The opinion did not dwell on this point but its inclusion as a contributing factor in the decision has significance.

The second noteworthy point is the further support given to the principle of comprehensive zoning. The court was so convinced of the value of a general plan that it was unwilling to take a step which would invalidate that plan. In relieving the plaintiff's land from the operation of the zoning ordinance the court found justification for its action in the fact that "the inclusion of the locus in question (in the residential district) is not indispensable to the general plan." This statement should give reassurance to those who may be inclined to see in this case a hostile attitude on the part of the court to zoning as such.

But while granting the value of zoning, the court recognized that "the

governmental power to interfere by zoning regulations with the general rights of the landowner by restricting the character of his use, is not unlimited and other questions aside, such restriction cannot be imposed if it does not bear a substantial relation to the public health, safety, morals or general welfare." The justices of the Supreme Court have apparently decided, therefore, that they shall determine whether a zoning ordinance is "reasonable" in its application, i. e. whether it definitely promotes the general welfare. This emphasis on the concept of reasonableness in application in zoning is the significant point in this case. Reasonableness is not a thing which can be established by general rules. It is something which must be determined with reference to the particular circumstances surrounding each case.

In the light of this decision it behooves zoning authorities to scrutinize their plans carefully, lest they be declared by the courts to be arbitrary and unreasonable exercises of the police power. The very nature of zoning which treats land in large areas makes necessary the exercise of special care in mapping out the different use districts. Particularly difficult are the border problems, such as the one involved here, and it is to be expected that many cases will arise to test the validity of rulings of zoning authorities. But they in turn should regard this case as a warning and attempt seriously to reduce the opportunities for negative decisions lest zoning fall into disrepute.

In the present writer's opinion the Cambridge case in no way lessened the importance of the earlier Euclid decision, which promises to remain a leading case. The later case did not supply rulings on any new points. None of the finer distinctions between use districts, such as single and/or two-family vs.

multi-family districts, were involved. The importance of this latest decision lies rather in the emphasis which it puts on certain points previously stated—mainly, that the test of zoning is to be found not in any fixed rules but in the light of its reasonable application to specific cases. Furthermore, the courts proclaim themselves the ultimate guardians of the general welfare which must be the object of all valid zoning restrictions.

HELEN C. MONCHOW

BOOK REVIEWS

Dorau, Herbert B., and Hinman, Albert G.
URBAN LAND ECONOMICS. New York: Macmillan Company, 1927. pp. xxi, 558. \$4.00.

Some fields of knowledge have been over-subdivided, over-specialized. Urban land economics is certainly not one of them. It suffers from a lack of any synthesized body of commonly accepted principles which can be referred to as guides in the solution of difficult cases, particularly those of private versus public economy.

Through actual practice and some formal study, which should not be ignored, real estate men have been working out the problems of highest and best use, ratio of improvement to site value, relation of land income to land value, and supersession, what might roughly be termed the evolution of property if left to itself. The city planners, on the other hand, have evolved certain doctrines regarding congestion, civic centers, height limitations, and so forth. Realization of these plans often restricts the use of urban private property, often assesses it heavily, and may have unexpected effects upon its future value. Neither side has paid much attention to the problems or the investigations of the other. Misunderstandings follow. A glowing scheme of public improvements appears to have been considered from the point of view of the benefits it will bring to the general public, the congested Polish immigrants, the motorists, the annual parade of the local lodge of the A I O U, the Commissioners of Local Improvements, the contractors, the members-in-good-standing of the Asphalt Spreaders Union—to everyone, in fact, except those who ultimately will pay the piper. These last named persons, if they object, are reviled as "Obstructionists"

(which they sometimes are) and they retort, "Visionaries."

In future deadlocks of this sort, Messrs. Dorau and Hinman may well appear as angels of light to both parties. Their book is in the first place an able exposition of such principles as are so generally proven and accepted that they might be termed "sound doctrine." As the first encyclopedists of this scattered body of knowledge the authors deserve exceptional credit.

The analysis of principles affecting the individual property in Parts II and V is comprehensive. The lack of reference to specific instances, however, might lead the student to rely too much on *a priori* reasoning and fail to realize that the idiosyncracies of each site—and some might say of each owner—and the acute problems of specialized uses are the types of questions which preoccupy those who make the actual decisions. When used as a textbook, however, this approach may not be so undesirable after all, if it forces the instructor to supplement theory by actual local examples.

Where public policy becomes involved, controversial issues are treated in a way which even extremists on either side can hardly characterize as other than sympathetic and fair—sometimes perhaps too much so; the authors appear to suspend judgment in some cases where it might well be given. A little more might perhaps be said about the practical working of certain innovations of public policy, for example, the success of Canadian cities in adjusting taxation of outlying lands on the verge of transition from agriculture to subdivisions (p. 291); or Savannah's municipal ownership of such areas (p. 258). Assuming that zoning is an accepted municipal policy, some

discussion of the difficult question of the technique of modifying zoning regulations could hardly have been regarded as out of order, particularly as the proponents of zoning, fearing for the legal and political safety of their fledgling, show some reluctance to tackle this issue. Perhaps they will ultimately succeed in shifting the responsibility for the whole matter to the land economist or the student of municipal administration!

In Chapter XXX, "Earned and Unearned Elements In Land Income" and cognate material elsewhere, the book rises to originality of thought and significance. Misty and musty arguments upon "the right of the public to the values it has created" on the one hand and the "sacred right of private property" on the other, if not refuted, will at least be outmoded by this clear "Justification of Rent as an Economic Reward."

GRAHAM ALDIS

PUBLIC UTILITIES AND CARRIERS SERVICE. United States Supreme Court; Public Utility Forms; Bibliography. Edited by Lilienthal and Rosenbaum. *Chicago: Commerce Clearing House, Inc., and Corporation Trust Co., 1928.*

The sources of public utility materials are so varied and so inadequately referenced that workers in the field find it exceedingly difficult to consult authorities and utilize published materials in solving their particular problems. Public Utilities and Carriers Service, instituted by the Commerce Clearing House, Inc., aims to organize and make available for easy use "the statutes, administrative regulations, commission and court decisions and technical data relating to state regulation of public utilities." The volume in hand contains a collection of United States Supreme Court decisions, as well as standardized forms and documents, and a bibliography of materials,

all indexed to meet the needs of the industry.

Under the head of United States Supreme Court decisions are considered all public utility cases decided by the Supreme Court which bear upon particular aspects of the legal problems of the industry. In addition the service includes hundreds of other cases which have been used analogically in building up the law of public service industries. In the notes on these cases both the holdings and the dicta are included and, instead of generalizations from the case, the specific findings are briefed, making the notes useful for all time in spite of possible legal and economic changes affecting the industry.

This compilation will simplify the work of finding federal legal authority on any point relative to public utilities. Heretofore, any one desirous of working up particular aspects of the United States Supreme Court decisions on the public service industries had to delve through various headings in the digests to secure references where the annotations often were not made for the particular purpose in hand. The present work is well done; the notes are concise but adequate to outline just what the court held under specified conditions; and the index is a clear guide to the specialized problems encountered in the field.

The section on forms and documents is not yet complete, but an excellent start has been made toward the compilation of approved, model forms and documents in a field where standardized forms are of prime necessity because they are subject to regulatory scrutiny and approval.

As to the bibliography, only sample pages are included. The purpose is to compile and keep up to date an annotated bibliography covering all the available materials pertaining to the public

utility field. Such material will be cross indexed, briefly annotated, and graded according to reader usefulness. Its aim is to enable individuals to refer quickly to desired materials published in the field and permit selection according to their particular needs without having to cull a mass of worthless articles or handle extensive reference volumes not adequately indexed for their purpose.

The compilation in this volume is of a type for which there has been a long-felt need on the part of those dealing with public utility problems, particularly from the economic standpoint, but also from the legal point of view. Such service is best rendered by a centralized, specialized organization which records the material in a permanently useful form. Furthermore, the volume shows a highly developed research technique which is not ordinarily found in most commercial research publications. This service appears to be in the hands of qualified men and will undoubtedly prove valuable to those interested in the industry.

H. B. DORAU.

PUBLIC UTILITIES AND CARRIERS SERVICE. Illinois. Edited by Lilienthal and Rosenbaum. *Chicago: Commerce Clearing House, Inc., and Corporation Trust Co., 1928.*

Any one familiar with the difficulties involved in securing adequate legal and technical information about the practices of public utility regulation in a particular state will readily appreciate the advantages of a comprehensive and accurate organization of the technical material and commission and court decisions in the field of public utility regulation. In view of the inadequate information contained in many public service commission reports and the poor indexing methods used, the organized compilation of such material is in itself a tremendous task.

A real service is provided, when, to this task of compilation, are added the niceties of careful selection of material, proper indexing and annotation. This first volume of state annotations brings the material for Illinois up to date and the service purports to keep it up to date through the loose-leaf device.

Under the head of "Commission Act Annotations," the editors consider the Illinois Commerce Commission Act, section by section, with selective annotations of historical background and commission decisions applicable to that section. For example, in the important section on Valuation (Section 30 of the Commission Act) the annotation is very complete. Controversial questions are treated from the standpoint of the Commission Act and the Commission decisions thereunder rather than from the more theoretical standpoint of the economist. The law of the state covering the particular question is quoted and the Commission's interpretation of the law is given in quotations from decisions. The decimal system of indexing makes it possible to insert additional decisions into the body of the text when and as they are made.

The Illinois constitutional provisions, specifically applicable to public utilities, are covered in the next section of the service. The important supplementary statutes, such as the General Corporation Act, the Cities and Villages Act (municipal regulation) and the various statutes dealing with the powers and duties of steam railroads, street and elevated railroads, gas, telephone, hydro-electric companies and warehouses are also quoted, together with useful cross-references to other unofficial compilations.

The next section, "Rules and Regulations of the Illinois Commerce Commission," contains important information

on standards of service for various types of public utilities, and complete technical information on standard construction practices, as well as paragraphs on the organization of the Commission and rules of practice and procedure before it. The technical information is illustrated with plates and tables covering overhead electrical construction and track centers and clearances. Other features of this section are the rules governing schedules of rates, consumers' deposits, accident reports, and safety devices. A new and timely section on motor carriers is included.

The service is prefaced by a detailed table of contents, and a complete table of cases and index to the Illinois volume are appended. This service might well aid in solving the Illinois Commerce Commission's problem of inadequate financing provisions for technical personnel. If it comes into the hands of the proper persons, we can expect a much needed improvement in the use of economic principles by technical men. It is a distinct contribution to the materials of state public utility regulation.

PAUL J. RAVER.

BOOK NOTICES

Kneier, Charles Mayard. *STATE REGULATION OF PUBLIC UTILITIES IN ILLINOIS. Urbana: University of Illinois, 1927. pp. 188. \$1.50.*

This monograph is one of a series of studies in the social sciences published by the University of Illinois. The author has presented an examination of the law and the practice of public utility regulation in Illinois which is especially significant in view of the various agitations for home rule, the current discussion of the indeterminate permit, and the frequent attempts which have been made at every session of the General Assembly since 1913 to change some part of the Public Utilities Act.

The first chapter summarizes informingly the growth of the idea of regulation from its roots in the guild system of the Middle Ages through the period of laissez-faire to the establishment of the mandatory commission of today. In chapters II and III a more intensive survey of this growth prior to 1913 is made for the State of Illinois. Chapter IV considers the organization of the Illinois Commission, previous experience and political considerations entering into the appointment of its personnel, the cost per capita of its operation, and a critique of the various reports which it has issued.

The next two chapters are devoted to an analysis of the decisions of the Commission relative to methods of determining fair

value, the rate of return, emergency rates, service standards, and the uses of the certificate of convenience and necessity. The Commission follows the rule of *Smyth v. Ames* in determining fair value, bases its judgment on a "proper consideration of all relevant facts" in determining the amount to be set aside for depreciation, takes into consideration the "inherent risks of public utility investments in general" in determining fair rate of return, and, thus far, has shown little or no tendency to develop and formulate general principles of its own for the regulation of these matters.

In a chapter on the control of accounting methods and security issues the author points out that the major purpose of such control is financial stability. A uniform classification of accounts is in force under the supervision of a special Accounting Section of the Illinois Commission but municipally owned utilities are not subject to its jurisdiction. The Commission has been criticized for approving security issues without making adequate investigations of their amount and character. The author suggests that this function might be handled more efficiently if a larger staff were employed in the Accounting Section. The Commission has also been handicapped by inadequate appropriations for engineers and other employees. As a result, long delays are common in the hearings and in many cases the attitude of the Commission has

necessarily been judicial rather than administrative.

In an especially enlightening chapter on the local regulation of public utilities in Illinois, the author reviews the various bills which have been presented to the legislature affecting home rule and points out that the only vestige of home rule which has thus far been secured is the exemption of municipally owned utilities from the supervision of the Commission. The result has been extreme centralization of control. He points out, however, that some degree of control is exercised by municipalities over the utilities operating in their streets and discusses those sections of the State Constitution by which such control is retained. The author closes the chapter with a summary of the arguments for and against home rule and points out that in considering both sides of the question we should not lose sight of the ideal to "elevate public utility regulation to the level of a science"—an ideal which has not been reached but is more likely of attainment, at least in cities of less than 50,000 population, through the medium of a state rather than a local commission.

The body of the text is kept free from burdensome case and documentary material, although a wealth of such material is presented in the footnotes. In addition there is an Appendix of Tables, including a list of the personnel of the Commission, appropriations for its work, and comparative valuations allowed in a number of cases in Illinois during the period from 1914 to 1923.

Modern public utility regulatory practices, with newer and more intelligent standards of work and a developing technique, are finding a definite place in our system of social control. The author has given us a readable book on the subject, comparing the development of the judicial, legislative and administrative technique in Illinois with that in the other states and in the Federal Government.

PAUL J. RAVEN

Baker, Newman F. *LEGAL ASPECTS OF ZONING*. Chicago: University of Chicago Press, 1927. pp. 177. \$2.50.

If all aspects of zoning were as carefully and as thoroughly discussed as the legal we would indeed have cause for encouragement. Mr. Baker has produced a little volume, much of the material of which he had published previously in various law journals,

which deserves to be ranked with the work of Mr. E. M. Bassett, Mr. Frank B. Williams and others. It is a lucid but not oversimplified discussion of the police power as it is being applied to private property in urban land.

Mr. Baker stays close throughout his treatment to quotations from leading cases but he also understands the problems of urban life which are behind zoning and city planning. He emphasizes again for the layman the primary problem of distinguishing between the unreasonableness of some zoning restrictions and the constitutionality of zoning in general; he points out the necessity for a careful zoning enabling act and the difficulties which have followed the efforts of some cities to zone under their municipal charters without an enabling act; and he devotes a chapter to the "safety-value" of the ordinance, the board of appeals, on which many of the most perplexing questions of present zoning practice are centered. Although he does not spend much time on the advantages of zoning over deed restrictions as a form of control, his ideas are clear and carefully substantiated. The decision of the United States Supreme Court in the famous *Euclid Village* case, as well as the leading cases in state courts, are well presented, and the selection of quotations from opinions is excellent.

The first and last chapters are called respectively, "Municipal Aesthetics and the Law" and "The Problem of the Metropolitan Area or Region." Just why they are placed as they are is not too obvious but they are chapters well worth reading and they show Mr. Baker in a new role, that of a prophet—indeed a strange contrast to the ordinary conception of legal scholars! He suggests some sort of municipal federalism as the solution to the quandary of economic regions and politically bounded municipalities.

After pointing out the slowness of courts to uphold measures of municipal aesthetics unless some connection with "safety, morality, health and decency" is shown, Mr. Baker predicts (p. 27):

" . . . that the time is not distant when the courts of our country will hold that reasonable legislation affecting the property of the individuals will be considered constitutional if passed to promote the well-being of the people by making their surroundings more attractive, their lot more contented and by inspiring a greater degree of civic pride.

The decisions denying that the suppression of ugliness is a necessity do not settle the question for all time. As soon as the average person may be thought to have developed an appreciation of the beautiful, the courts will, no doubt, sanction legislation for aesthetic purposes. Whenever things, once considered luxuries, become, in the course of progress, necessities, the courts may be depended upon to treat them as such."

One cannot help but hope that Mr. Baker is as wise a prophet as he is a convincing student of the law.

COLEMAN WOODBURY

Lauck, W. Jett. *POLITICAL AND INDUSTRIAL DEMOCRACY, 1776-1926*. New York: Funk and Wagnalls Company, 1926, pp. x, 374. \$2.

This book gives a survey of industrial democracy since the close of the World War. After developing rather slowly as a reaction against the rapid ascendancy of economic autocracy within the system of political democracy, the movement for democratization of industry became crystallized during the War as part of the general program "to make the world safe for democracy." It reached a peak during the two years following the Armistice, only to be brought to a standstill by the depression which began in the spring of 1920, and which was followed by the open shop drive under the American plan. After that, according to the author, the movement assumed a much saner form, one more likely to produce permanent results in the future.

Having described at length the fundamental principles of industrial democracy, the author gives a general summary of the recent movement. In his opinion it expressed itself in the form of the development of employee representation plans, stock ownership schemes and other devices. Most of the information for this part is drawn from reports of the National Industrial Conference Board. This is followed by a brief description of 22 of the "outstanding and typical" plans of employee representation and various welfare schemes. These plans are then subjected to a critical examination on the basis of the fundamental principles of industrial democracy discussed previously, and the conclusion is reached that the Mitten plan furnishes the best basis for a scheme of industrial democracy.

Among the fundamental principles of industrial democracy, which are advanced by the author, the chief ones are as follows: (1) The coordination of the employee representation plan with the labor union to form an independent organization that is able to bargain on an equal basis with the employer; (2) The gradual acquisition of the ownership of industry by the employees through the purchase of voting stock on a collective basis, as well as the meeting of new capital requirements through the co-operative effort of the employees and customers, thus freeing industry from the grip of the investment banker. It seems that the author regards the latter as the better method of placing industrial democracy on a permanent basis.

The Mitten plan has not included dealings with a bona fide trade union until recently. On March 25, 1928 an agreement was made between the trade union and Mitten management defining their respective spheres of influence. The latter expressed willingness to bargain with union representatives, should two-thirds of the employees vote favorably. However, the Mitten plan does provide for the gradual acquisition of ownership by the employees and customers.

It is the opinion of the writer of this note that the recognition of the union is a more essential guarantee than the acquisition of ownership by the workers. At best the latter can be accomplished only on a partial basis, except in the case of small plants, while a strong union will always be a good bulwark against any attacks on the job. Accordingly, the plan of industrial democracy as it appears in the Hart, Schaffner and Marx agreement with the Amalgamated Clothing Workers, which is barely mentioned in this book, furnishes a far more important basis for future development than does the Mitten plan.

The book is a good foundation for further study of the problem of industrial democracy. The next step, it seems, is to make a close study from the inside of each of the plans of employee representation.

JACOB PERLMAN

Holmes, C. L. *ECONOMICS OF FARM ORGANIZATION AND MANAGEMENT*. Boston: D. C. Heath & Co., 1928. pp. xvi, 416. \$2.80.

Those who are conversant with farmers' problems today recognize that it is just as

necessary for a farm manager to know the economic forces affecting the farming industry as it is for him to know the technical aspects of production. Production for profit means that the farmer must have full knowledge of the economic forces influencing his rate of return. Dr. Holmes' book is a definite effort to apply the principles of general economics to the problems involved in farm organization and management. He takes such economic phenomena as value, price, costs, diminishing returns, capacity and efficiency and shows how they affect the efficiency of, and the return to, agriculture. In treating his subject, the author tries to confine himself chiefly to those economic forces that arise out of the peculiarities of the industry, and avoids discussing forces external to farming.

For the most part, the author's aim is to give a brief, concise statement of principles. He does, however, go into considerable detail on the selection and combination of the factors of farm production. In his discussion on this point, he adheres to the marginal concept and uses it to show how the most efficient utilization of the various factors of production can be secured. He also gives a careful and practical analysis of the nature of farm costs, the difficulties of accurate farm cost accounting, and the extent to which farmers can acquire and make use of cost data in their business.

The one unique feature of the book is that Dr. Holmes differentiates between the problems of farm organization and management. Organization consists of outlining a plan for using the physical equipment of the industry to secure a particular kind and amount of product. It provides a framework for the building of a going concern. Management executes the plans and policies of the organization. In actual farm practice both functions are usually performed by one man and, although the problems arising under each heading are of a different type, many writers do not consider the distinction between organization and management sufficiently clear to warrant treating them separately.

In general, the author writes in admirable style. His statements of principles are clear and concise. He is a firm believer in the problem method of teaching, and prefaces each chapter with a series of excellent questions to stimulate thinking. If supplemented with additional reading, the book should

make a useful text for an elementary course on farm organization and management.

LOUIS A. KELLER

Mauldon, F. R. E. *A STUDY IN SOCIAL ECONOMICS, THE HUNTER RIVER VALLEY, NEW SOUTH WALES. Melbourne, Australia: Workers' Educational Association of N. S. W., in conjunction with Robertson and Mullens, Ltd., 1927. pp. v, 201. 12/6.*

The purpose of the author of this book is to study the economic development of a community as influenced by the physical surroundings and the inter-play of social forces which are the outcome of the various occupations and activities of the community. He confines his study to the valley of the Hunter River of New South Wales, Australia, an area of approximately 8,000 square miles and containing a population of about 225,000. He begins the study with a description of the topographic, geologic, and geographic features of the area and notes, in some detail, the influence of these upon the distribution of rainfall and soils, and upon the grade, composition and economic value of the coal deposits, the most important mineral resource.

A chapter is devoted to the agricultural industry, in which the type of farming as influenced by the combined effect of rainfall distribution and soil conditions is described. The relationship between physical environment and type of agriculture is reviewed in each of the seven fairly distinct agricultural districts. The unfortunate circumstance of insufficient rainfall upon the area of the most fertile soils, and an absence of good soils in some of the well-watered regions is an important feature in explaining the utilization of the land.

The chapter on extractive industries deals entirely with the coal mining industry. Here the author analyzes the technical problems of winning coal from the mines, the relation of coal to the industrial development of the valley, the position of coal in domestic and overseas commerce, the socio-economic problems of the coal industry, i. e., the traits of the miner and the mining communities and their consequent reaction to owner-employee relations, the results of compulsory arbitration as a means of settling disputes, and the inadequacy of the present machinery. The position of the coal industry in the economy

of the region is summarized by describing those conditions of the industry which are still far from satisfactory to both miners and operators and by suggesting lines of reform.

The material on the manufacturing industries is divided into two portions—the descriptive and the analytical. The latter portion treats of certain problems of the manufacturing industries classified as (1) the problem of industrial fluctuation, (2) the problem of foreign competition, and (3) the problem of labor. Each of these is analyzed and suggestions are offered for ameliorating unsatisfactory conditions or promoting industrial growth and markets for the products. Because of the interrelation of transportation and manufacturing, the transportation facilities and services are described and methods of promoting home industries through favorable rate structures are discussed.

The last two chapters treat of the economic organizations—their aims and policies. These organizations include agricultural, manufacturing, mining, and consumers' associations, and can be grouped into three classes, viz., the co-operatives among the agriculturists, the consumers' co-operatives, and the defense organizations among employers and operatives. Each is described and analyzed in considerable detail.

The author concludes that the various groups in the Hunter River Valley are still lacking in conscious cooperation for the most effective development and equitable distribution of wealth. Interests are still too strongly sectionalized to permit a well-knit economy for the region, and the author suggests that one way of achieving this goal is to cultivate a sense of interdependence among all the economic interests of the region. The book represents a worth-while effort in this direction through the process

of adult education in classes of wage earners whose sectionalism is likely to be pronounced, though probably no more pronounced than among other economic groups.

WALTER H. VOSKUIL

Bailey, L. H. *THE HARVEST*. New York: Macmillan Co., 1927. pp. 209. \$1.50.

This book is an important contribution to the literature of agriculture. It breathes the sweetness of country life. Last July I spent a hot day in the agricultural building at Urbana dealing with many facts and figures relating to the agricultural situation. About five o'clock in the afternoon I was led east from the agricultural building into the sunken gardens where the air was cool, moist and fragrant. The reading of this book made me think of this garden and its contrast to the atmosphere of the agricultural building. This book is the product of a poet and philosopher who knows the seriousness of the problems of the day, but who would help the farmer garner the best there is out of life on the farm whatever the conditions affecting agriculture from the outside may be.

The phrase, "The farmer must depend on his land rather than on his market," shows the trend of thought. And again, "It is the farmer's rare privilege to raise crops and rear animals. The sheer joy of the thing is itself a reward. It is this reward that I wish to recognize in this little book and to defend against the invasion of mere statistical and commercial valuations." And yet the author recognizes that the general setting of agriculture in a national life needs full consideration: "Society has a larger stake in the welfare of the farmer than in that of any other man."

H. C. TAYLOR

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